REQUEST FOR PROPOSAL
MIDWESTERN STATE UNIVERSITY
PURCHASING & CONTRACT MANAGEMENT DEPARTMENT
3410 Taft Blvd., Daniel Bldg., Rm. 202
Wichita Falls, TX. 76308

BID NUMBER	BID TITLE
735-18-8203	**Quad's Landscaping**

BIDS WILL BE RECEIVED BY SEALED BID OR EMAIL UNTIL:
2:00 P.M.,
May 1, 2018 to:
the office's of the Director of Purchasing & Contract Management,
3410 Taft Blvd., Daniel Bldg., Rm. 202
Wichita Falls, TX. 76308

GENERAL TERMS AND CONDITIONS

These General Terms and Conditions apply to all offers made to Midwestern State University (herein after referred to as "University") by all prospective vendors (herein after referred to as "Bidders") on behalf of Solicitations including, but not limited to, Invitations to Bid and Request for Quotes.

INSTRUCTIONS FOR SUBMITTING BIDS

Review this document in its entirety. Be sure your bid is complete, and double check your bid for accuracy.

Questions requiring only clarification of instructions or specifications will be handled through the email process. If any questions results in a change or addition to this Bid, the change(s) and addition(s) will be addressed to all vendors involved as quickly as possible in the form of an addendum. It is the responsibility of the bidder to view the posting on the MSU purchasing web page located at http://mwsu.edu/purchasing/.

Sign the **Vendor's Affidavit Notice** and return with your bid.

BIDDERS SHALL SUBMIT BID ON THE FORM PROVIDED, SIGN THE VENDOR AFFIDAVIT, AND RETURN ENTIRE BID PACKET. In the event of inclement weather and the University Offices are officially closed on a bid opening day, bids will be received until 2:00 p.m. of the next business day. At which time said bids will be privately opened.

BIDS SUBMITTED AFTER THE SUBMISSION DEADLINE SHALL BE RETURNED UNOPENED AND WILL BE CONSIDERED VOID AND UNACCEPTABLE.

SUCCESSFUL VENDOR WILL BE NOTIFIED BY EMAIL OR MAIL. All responding vendors will receive written notification regarding the outcome of the award. Bid tabulations will be posted to the MSU Purchasing we page.

PLEASE NOTE CAREFULLY

THIS IS THE ONLY APPROVED INSTRUCTION FOR THIS BID. ITEMS BELOW APPLY TO AND BECOME PART OF TERMS AND CONDITIONS OF BID. ANY EXCEPTIONS THERETO MUST BE IN WRITING.

1. Each bid shall be emailed or placed in a separate envelope completely and properly identified with the name and number of bid. Bids must be in the Purchasing Office **BEFORE** the hour and date specified.

2. **QUOTE F.O.B. DESTINATION.** If otherwise, show exact cost to deliver. Bid unit price on quantity specified – extend and show total. In case of errors in extension, UNIT prices shall govern. Bids subject to unlimited price increase will not be considered.

3. Bids **MUST** give full firm name and address of the bidder. Failure to manually sign bid will disqualify it. Person signing bid should show TITLE or AUTHORITY TO BIND HIS FIRM IN A CONTRACT.

4. Bids **CANNOT** be altered or amended after opening time. Any alterations made before opening time must be initialed by bidder or his authorized agent. No bid can be withdrawn after opening without the approval by the Vice-President of Administration & Finance based on a written acceptable reason.

5. The University is exempt from State Sales Tax and Federal Excise Tax. **DO NOT INCLUDE TAX IN BID.**

6. Any catalog, brand name or manufacturer's reference used in a bid invitation is descriptive-**NOT** restrictive-it is to indicate type and quality desired unless otherwise indicated. Bids on brand of like nature and quality will be considered. If bid is based on other than referenced specifications, proposal must show manufacturer, brand or trade name, lot number, etc., of article offered. If other than brand(s) specified is offered, illustrations and complete description should be made part of the bid. If bidder takes no exception to specifications or reference data, he will be required to furnish brand names, numbers, etc., as specified.

7. Samples, when requested, must be furnished free of expense to the University. If not destroyed in examination, they will be returned to the bidder on request, at his

expense. Each sample should be marked with bidder's name, address, and University bid number. **DO NOT ENCLOSE OR ATTACH SAMPLE TO BID.**

8. **Delivery:** Bid must show number of days required to make delivery to place material in receiving agency's designated location under normal conditions. Failure to state delivery time obligates bidder to complete delivery in 14 calendar days. A five-day difference in delivery promise may break a tie. Un realistically short or long delivery promises may cause bid to be disregarded. Consistent failure to meet delivery promises without valid reason may cause removal from bidder list. Delivery shall be made during normal working hours only, 8:00 a.m. to 5:00 p.m., unless prior approval for late delivery has been obtained from the Director of Purchasing.

9. If delay is foreseen, contractor shall give written notice to Director of Purchasing. The University has the right to extend delivery date if reasons appear valid. Contractor must keep University advised at all times of status of order. Default in promised delivery (without accepted reasons) or failure to meet specifications, authorizes the University to purchase supplies elsewhere and charge full increase in cost and handling to defaulting contractor.

10. All items proposed shall be new, in first class condition suitable for shipment and storage (Midwestern State University prefers recycled packaging whenever possible), unless otherwise indicated in bid. Verbal agreements to the University will not be recognized. All materials and services shall be subject to Purchaser's approval. Unsatisfactory materials will be returned at Seller's expense.

11. Written and verbal inquires pertaining to bids must give Bid Number and Commodity.

12. No substitutions or cancellations permitted without written approval of Director of Purchasing.

13. The University reserves the right to accept or reject all or any part of any bid, waive minor technicalities and award to the Bidder that bids to the Best Value to the University. The University reserves the right to award by item or by total bid. Prices should be itemized.

14. Consistent and continued tie bidding could cause rejection of bids by the University and/or investigation for Anti-Trust violations.

15. The contractor agrees to protect the University from claims involving infringement of patents or copyrights.

16. This is a Quotation inquiry only and implies no obligation on the part of the University. All costs quotations must include all the various features needed to satisfy the requirements. Note: No amounts will be paid for the items in this BID in excess of the amounts quoted.

17. **Award:** A written purchase order or notice of award mailed or otherwise furnished to the successful bidder within the time of acceptance specified in this package results in a binding contract without further action by either party.

18. **Variation in Quantity:** The University assumes no liability for commodities produced, processed or shipped in excess of the amount specified herein.

19. **Invoicing:** Bidder shall submit two (2) copies of an itemized invoice shoeing bid number and purchase order number to:

Midwestern State University
Accounts Payable
3410 Taft Blvd.
Wichita Falls, TX. 76308

20. **Payments:** The University, after receipt of completed order will make payment to the contractor within 30 days from the receipt of goods or invoice which ever is later. All partial shipment must be pre-approved by the Director of Purchasing. In the event of partial shipments the University is not required to make payments until the order is complete. Acceptance of and final payment for the item will be contingent upon satisfactory performance of the product received by the University.

21. **Discrimination:** In order to comply with the provisions of fair employment practices, the contractor agrees as follows; 1.) the contractor will not discriminate against any employee or applicant for employment because of race, sex, religion, handicap, or national origin; 2.) in all solicitations or advertisements for employees, the contactor will state that all qualified applicants will receive consideration without regard to race, color, sex, age, religion, handicap or national origin; 3.) the contractor will furnish such relevant information and reports as request by the University for the purpose of determining compliance with these regulations; and 4.) failure of the contractor to comply with these laws will be deemed a breach of contract and it may be cancelled, terminated or suspended in whole or in part.

22. **Assignment:** Any contract entered into pursuant to this request is not assignable, nor the duties thereunder, by either party without the written consent of the other party in the contract.

23. **Other Remedies:** In addition to the remedies stated herein, the University has the right to pursue other remedies permitted by law or in equity.

24. **E-Verify**: Contractor is responsible to verify all employees are approved by The Homeland Security E-Verify program.

25. **Bonds**: For construction type awards, if bids are over $25,000 a payment bond will be required if awarded the contract. A performance bond will be required if award is over $100,000.

REQUEST FOR PROPOSAL

QUAD'S LANDSCAPING
MIDWESTERN STATE UNIVERSITY

It is the intent of these specifications to describe the minimum requirements for **the above titled project** at Midwestern State University in sufficient detail to secure comparable bids.

Each bidder must confirm he fully understands these specifications and the University's needs and satisfies himself that he is cognizant of all factors relating to requirements contained in these specifications.

The bid analysis will include compliance to bid specifications, past performance with vendor, references, delivery time, which will have a weighted average of 30 percent and the overall cost to the university, which will have a weighted average of 70 percent. Midwestern State University reserves the right to consider deviations from these specifications.

Award of this bid will be contingent on availability of Midwestern State University funds.

References shall be included on this bid form. Three current customers with a comparable purchase shall be listed with complete name, address, telephone number and contact person.

Bids must be submitted on this form and the bidder shall return the entire bid/specification package which will constitute a contract equally binding between the bidder and Midwestern State University if bids accepted by the University. Each bid shall be placed in a sealed envelope or emailed, signed by a person having the authority to bind his/her firm in a contract.

This contract shall remain in effect until completion and acceptance by the University. Midwestern State University reserves the right to enforce the performance of this contract in any manner prescribed by law or deemed to be in the best interest of the University in the event of breach or default if this contract. Midwestern State University reserves the right to terminate the contract immediately in the event the successful bidder fails to make delivery in accordance with the specifications.

Questions concerning these specifications should be directed via email no later than April 20, 2018 to:

Stephen Shelley, Director of Purchasing and Contract Management
3410 Taft Blvd. Daniel Bldg. Rm. 202
Wichita Falls, TX. 76308
stephen.shelley@mwsu.edu
(940) 397-4110

Midwestern State University may in it's sole discretion respond in writing to questions concerning this bid request. Only MSU responses made by formal written addendum to this proposal shall be binding and shall be posted on the MSU purchasing web site located at http://mwsu.edu/purchasing/. Oral or other written interpretations or clarifications shall be without legal effect.

All bids meeting the intent of this invitation to bid will be considered for award. Bidders taking exception to the specifications, or offering substitutions, shall state these exceptions by attachment as part of the bid. The absence of such a list shall indicate that the bidder has not taken exception and shall hold the bidder responsible to perform in strict accordance with the specifications of the invitation. Midwestern State University reserves the right to accept any and all or none of the exception(s) / substitution(s) deemed to be in the best interest of the University.

PRE-BID MEETING: A pre-bid meeting will be held at **10:00 a.m. on April 17, 2018 in room 189 located in the Dillard Building**, Midwestern State University, 3410 Taft Blvd., Wichita Falls, Texas.

Proposals are to be sent via email or hand delivered to:

Stephen Shelley, Director of Purchasing and Contract Management
3410 Taft Blvd. Daniel Bldg. Rm. 202
Wichita Falls, TX. 76308
stephen.shelley@mwsu.edu
(940) 397-4110

SPECIFICATIONS
RFP #735-18-8203

Please see specifications and drawing at the below Link under current bid opportunities listed under the RFP number:
http://mwsu.edu/purchasing/

Please supply a HUB Subcontracting Plan with your bid, which can be found at the below listed link:
http://www.window.state.tx.us/procurement/prog/hub/hub-subcontracting-plan/

Please supply schedule and lead time for project with bid:

Supply an insurance certificate with your Bid.

Supply a W-9 With your Bid if new to Midwestern State University.

2010 Uniform General Conditions apply to this Bid and can be found at the below listed link:
http://mwsu.edu/purchasing/contract-management

SCHEDULE: Work to begin on the Quad and Mustang Walk extensions on May 14, 2018 and be completed no later than August 10, 2018. Contractor's schedule shall account for the standard number of weather days per NOAA for May-August in Wichita Falls. There are no LD's.

A Bid Bond of 5% needs to accompany your Bid.

SECTION 01 11 00
SUMMARY OF WORK, QUAD LANDSCAPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The Project name is "Quad Landscaping".

1. Project Location: Midwestern State University, Wichita Falls, Texas

B. Contract Documents were prepared for the project by:

KDC Associates
4400 N. Big Spring, Suite 203
Midland, Texas 79705
432.686.8001
www.kdcassociates.com

C. The Work consists of the preparation and installation of landscape elements and related amenity and site work at the new Project.

D. The Work will be constructed under a single prime contract.

E. Construction of the HS+HS Landscaping is a separate contract which may or may not be issued to the same contractor as the Quad Landscaping contractor. The Mustangs Walk Extensions are Alternates for the Quad Landscaping contract.

F. Work for the Quad Landscaping (and Mustangs Walk Extensions which are Alternates to the Quad Landscaping Project) shall begin on May 14, 2018 with Substantial Completion by August 17, 2018. Work to occur simultaneously with the Mustang Walk Extension Alternates Projects.

1.3 WORK UNDER OTHER CONTRACTS

A. Construction of the HS+HS building is under a separate contract where the construction process was initiated in February 2018.

B. The Quad Landscaping contractor shall be responsible for coordination of the work described in these specs and drawings so as NOT to hinder the completion of construction related to the HS+HS building, north parking lot, utilities for the new building, or the storm water

pollution prevention plan for the new building. These projects are scheduled for Substantial Completion to occur on May 16, 2019 and Final Completion on June 14, 2019.

C. When performing work on the HS+HS site while in the care and custody of Trinity Hughes Sundt, Subcontractor must follow Sundt's project safety plan. The plan is inclusive of 100% hard hat, high visibility clothing, eye protection, shirts with sleeves and hard soled shoes (no tennis shoes).

D. Work hours for the HS+HS site are 7:00 AM to 5:00 PM, Monday – Friday. After hours work and weekend work will be accommodated with 72 hour notice. A Trinity Hughes Sundt employee must be present when any work is being performed on the HS+HS site.

E. Cooperate fully with separate contractors for HS+HS so that work under those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.

1.4 CONTRACTOR USE OF PREMISES

A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.

1. Owner Occupancy: Allow for Owner occupancy of the existing building and use by the public during the construction period.
2. Driveways and Entrances: Keep driveways and entrances outside the contract limits clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

B. Use of the Existing Building: Maintain the existing building in a weathertight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.

1.5 OCCUPANCY REQUIREMENTS

A. Full Owner Occupancy: The Owner may occupy the site and existing building during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate owner usage. Perform the Work so as not to interfere with the Owner's operations.

B. Partial Owner Occupancy: The Owner reserves the right to occupy and to place and install equipment in completed areas of the building prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.

END OF SECTION 01010

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

Section Includes:

Cast-in-place normal weight and lightweight concrete, placement and finishing.

Related Requirements:

Division 01 - General Requirements.

Section 32 1313: Site Concrete Work.

Section 03 1000: Concrete Forming and Accessories.

Section 03 2000: Concrete Reinforcing.

Section 07 2600: Vapor Barriers.

1.02 REFERENCES

American Concrete Institute (ACI) Publication:

ACI 117 – Specifications for Tolerances for Concrete Construction and Materials.

ACI 301 – Specifications for Structural Concrete.

ACI 302.1R – Guide for Concrete Floor and Slab Construction.

ACI 305R - Specification for Hot Weather Concreting.

ACI 306.1 – Standard Specification for Cold Weather Concreting.

ACI 308R – Guide to External Curing of Concrete.

ACI 318 - Building Code Requirements for Structural Concrete, as modified by CBC Sections 1903A and 1905A.

American Society for Testing and Materials (ASTM) Standards:

ASTM C31 – Standard Specification for Making and Curing Concrete Test Specimens in the Field.

ASTM C33 - Standard Specification for Concrete Aggregates.

ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

ASTM C88 - Standard Test Method for Soundness of Aggregates by use of Sodium Sulphate or Magnesium Sulphate.

ASTM C94 - Standard Specification for Ready-Mixed Concrete.

ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.

ASTM C150 - Standard Specification for Portland Cement.

ASTM C156 – Standard Test Method for Water Loss (from a Mortar Specimen) Through Liquid membrane-Forming Curing Compounds for Concrete.

ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.

ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete.

ASTM C173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete.

ASTM C289 - Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).

ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
ASTM C567 - Standard Test Method for Determining Density of Structural Lightweight Concrete.
ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
ASTM C845 - Standard Specification for Expansive Hydraulic Cement
ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
ASTM C1315 – Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
ASTM D1308 – Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
ASTM C1567 - Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method).
ASTM D1751 - Standard Test Method for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
ASTM D7234 – Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.
ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
ASTM E1745 - Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In Situ Probes.
ASTM F3010 – Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use under Resilient Floor Coverings.

1.03 SUBMITTALS

Shop Drawings: Submit Shop Drawings indicating locations of cast-in-place concrete Work and accessory items such as vapor barriers. Include details and locations of reinforcing, embedded items, and interfacing with other Work.

Mix Design Data: Submit concrete mix designs as specified herein and in Article 2.02. Submit name, address and telephone number of the concrete production facility which the contractor intends to engage to design the concrete mixes. Submit name and qualifications of the proposed concrete technologist.

Mix Design: Submit a concrete mix design for each strength and type of concrete indicated in the drawings or specified. Include water/cement ratio, source, size and amount of coarse aggregate and admixtures. Predict minimum compressive strength, maximum slump and air content percentage. Clearly indicate locations where each mix design will be used.
Water/cement ration for concrete slabs on grade shall be 0.50 maximum.

Test Reports: Submit copies of test reports showing that the proposed mixes produce concrete with the strengths and properties specified. Include tests for cement, aggregates and admixtures. Provide gradation analysis.

Material Samples: Submit Samples illustrating concrete finishes and hardeners, minimum 12-inch by 12-inch.

Certificates: Submit certification that each of the following conforms to the standards indicated:
Portland cement: ASTM C150.
Normal weight concrete aggregates: ASTM C33.
Lightweight concrete aggregates: ASTM C330.

Aggregates: Submit evidence that the aggregate is not reactive in the presence of cement alkalis. In the absence of evidence, aggregate shall be tested by one of the methods in ASTM C33 Appendix XI, Methods for Evaluating Potential for Deleterious Expansion Due to Alkali Reactivity of an Aggregate. Aggregates deemed to be deleterious or potentially deleterious may be used with the addition of a material that has been shown to prevent harmful expansion in accordance with Appendix XI of ASTM C33, when approved by the building official, in accordance to CBC Section 1903A5A.
Curing materials: ASTM C171.
Admixtures: Submit product data for proposed concrete admixtures.

1.04 QUALITY ASSURANCE

Continuous inspection shall be provided at the batch plant and for transit-mixed concrete to run check sieve analysis of aggregate, check moisture content of fine aggregate, check design of mix, check cement being used with test reports, check loading of mixer trucks, and certify to quantities of materials placed in each mixer truck.
Inspection shall be performed by a representative of a testing laboratory selected by the OWNER. OWNER will pay for inspection costs. Notify the laboratory 24 hours in advance of time concrete is to be mixed. Notify the laboratory of postponement or cancellation of mixing within at least 24 hours of scheduling time.
CONTRACTOR shall assist the testing laboratory in obtaining and handling samples at the project site and at the source of materials.
Continuous batch plant inspection requirement may be waived in accordance with CBC Section 1705A.3.3.1. Waiver shall be in writing, including DSA approval. When batch plant inspection is waived by DSA, the following requirements shall be met:
Approved inspector of the testing laboratory shall check the first batching at the start of work and furnish mix proportions to the licensed weightmaster.
Licensed weightmaster shall positively identify materials as to quantity and certify to each load by a ticket.

Tickets shall be transmitted to the Inspector by a truck driver with load identified thereon. The Inspector will not accept the load without a load ticket identifying the mix and will keep a daily record of placements, identifying each truck, its load and time of receipt and approximate location of deposit in the structure and will transmit a copy of the daily record to DSA.
At the end of the project, the weightmaster shall furnish an affidavit to DSA certifying that all concrete furnished conforms in every particular to proportions established by mix designs.
Special Inspections and Tests shall be in accordance with CBC Chapter 17A, Reinforcement and Anchor testing per CBC Section 1910A and Specification Section 01 4523.

1.05 DELIVERY, STORAGE AND HANDLING

Store cement and aggregate materials so as to prevent their deterioration or intrusion by foreign matter. Deteriorated or contaminated materials shall not be furnished.
Packaged materials shall bear the manufacturers and brand name label, and shall be stored in their original unbroken package in a weather tight place until ready for use in the work.

1.06 PROJECT CONDITIONS

Cold Weather Requirements: Batching, mixing, delivering and placing of concrete in cold weather shall comply with the applicable requirements of ACI 306.1.
Hot Weather Requirements: Batching, mixing, delivering and placing of concrete in hot weather shall comply with the applicable requirements of ACI 305R.
Concrete temperature of freshly mixed concrete shall be determined per ASTM C1064.

PART 2 - PRODUCTS

2.01 MATERIALS

Cement: ASTM C150. Portland Cement.
Aggregates: Conform to the following standards:
Normal weight concrete: ASTM C33.
Lightweight concrete: ASTM C330, with fine aggregates per ASTM C33.
Aggregate shall be tested for Potential Alkali Reactivity of Cement-Aggregate Combinations per ASTM C289.
Nominal maximum size of coarse aggregate shall be no larger than:
1/5 the narrowest dimension between sides of forms, nor
1/3 the depth of slabs, nor
3/4 the clear spacing between individual reinforcing bars or wires, bundles of bars, individual tendons, or ducts.
CONTRACTOR may request the ARCHITECT and DSA waiver of the above limitations reported per ACI 318, provided that the workability and methods of consolidation are such that the concrete can be placed without honeycombs or voids.
Water: Water for concrete mixes, curing and cleaning shall be potable and free from deleterious matter.
Admixtures: Shall be shown capable of maintaining essentially the same composition and performance throughout the work as the product used in establishing concrete proportions in accordance with ACI 318, Section 3.6.
Admixtures containing chlorides or sulfides are not permitted.

Air-entraining admixtures shall comply with ASTM C260. Air-entrained admixtures shall not be used for floor slabs to receive steel trowel finish.
Admixtures for water reduction and setting time modification shall conform to ASTM C494.
Admixtures for producing flowing concrete shall conform to ASTM C1017.
Admixtures containing ASTM C845 expansive cements shall be compatible with the cement and produce no deleterious effects.
Silica fumes used as an admixture shall conform to ASTM C1240.
Reinforcement Fibers: Chop strands of alkali-resistant polypropylene or nylon fibers added to the concrete mix for protection against shrinkage cracks.
Expansion Joint Fillers: Preformed strips, non-extruding and resilient bituminous type, of thickness indicated, conforming to ASTM D1751.

Curing:

Curing Paper: Shall conform to ASTM C171 and consist of two sheets of kraft paper cemented together with a bituminous material in which are embedded cords or strands of fiber running in both directions. The paper shall be light in color, shall be free of visible defects, with uniform appearance.
Elevated slabs and slabs on grade may be cured at CONTRACTOR's option with curing and proactive water vapor emission and alkalinity control system. Products shall be approved by OWNER's Office of Environmental Health and Safety.
VaporSeal 309, by Floor Seal Technology, Inc., or equal.

ASTM C156:	0.39 kg/m².
ASTM C309:	Exceeds requirements.
ASTM C1315:	Exceeds requirements.
ACI 308R-01	Compliant.

Remedial Treatment: Water vapor emission and alkalinity control treatment, MES 100 by Floor Seal Technology, Inc. or equal.

ASTM E96:	<0.1 Perms.
ASTM D1308:	14pH Resistant.
ASTM D7234:	500+psi 100% concrete failure.
ASTM F2170:	100%RH resistant.
VOC Content:	<100 g/L, meets SCAQMD Rule #1113.
ASTM F3010:	Meets Requirements.

Self-leveling Compounds: Ardex Engineered Cements, K15, Combimix; Leveler 720. Armstrong, S-194, or equal.
Floor Hardener: Water soluble, inorganic, silicate-based curing, hardening, sealing and dustproofing compound. Aquaseal W20 by Monopole Inc., Kure-N-Harden by BASF, Chem Hard by L&M, Liqui-Hard by W. R. Meadows, or equal.
Underlayment: Two component latex underlayment for filling low spots in concrete for both interior and exterior applications, from featheredge to a maximum of 3/8 inch in thickness. Underlayment shall be non-shrink and suitable for repairing exposed concrete surfaces and for underlayment of carpet, resilient, tile and quarry floor coverings. La-O-Tex by TexRite, Underlay C, RS by Mer-Krete Systems, Underlayment 962 by C-Cure, or equal.
Vapor Barrier: Refer to Section 07 2600, Vapor Barriers.
Stair Treads and Nosings: Two part stair tread and nosing with ribbed abrasive bars. Fabricated from 6063-T5 or 6063-T6 extruded aluminum, mill finish. Anti-slip abrasive

filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Color shall extend uniformly throughout filler.
American Safety Tread: TP-311R.
Balco Inc.: DST-330.
Nystrom: STTB-P3.375E.
Wooster Products Inc.: WP-RN3SG.
Equal.
Grout: ASTM C1107, non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 7 days; of consistency suitable for application and a 30 minute working time.

2.02 CONCRETE MIX

Mix shall be signed and sealed by a Civil or Structural Engineer currently registered in the State of California.
Strength of Concrete: Strengths and types of concretes shall be as indicated in the Drawings. Unless otherwise indicated or specified, concrete shall be provided with minimum 28-day strength of 3000 psi (f'c).
Concrete mix shall meet the durability requirements of ACI 318, Chapter 4.
Concrete proportioning shall be determined on the basis of field experience and/or trial mixtures shall in accordance with ACI 318, Section 5.3. Proportions of materials shall provide workability and consistency to permit concrete to be placed readily into forms and around reinforcement under conditions of placement to be employed, without segregation or excessive bleeding.
Ready-Mixed Concrete: Mix and deliver in accordance with requirements of ASTM C94.

PART 3 - EXECUTION

3.01 GENERAL

Surfaces to receive concrete shall be free of debris, standing water, and any other deleterious substances before start of concrete placing.
Time of Placing: Do not place concrete until reinforcement, conduits, outlet boxes, anchors, hangers, sleeves, bolts, and other embedded materials are securely fastened in place. Contact the Inspector at least 24 hours before placing concrete; do not place concrete until inspected by the Project Inspector.
Pouring Record: A record shall be kept on the Project site of time and date of placing concrete in each portion of structure. Such record shall be maintained on the Project site until Substantial Completion and shall be available for examination by the ARCHITECT and DSA.

3.02 TOLERANCES

Concrete construction tolerances shall be as specified in ACI 117 and as modified herein.
Floor Flatness (FF) and Floor Levelness (FL) shall be as indicated below:
Refer to ACI 302.1R, Tables 8.1 and 8.2 Slab on Ground and Suspended Flatness/Levelness Construction Guide, for recommended concrete placing and finishing methods.
Floor Flatness and Floor Levelness shall be tested in accordance to ASTM E1155.
Floor measurements shall be made within 48 hours after slab installation, and shall precede removal of shores and forms.

3.03 PREPARATION

For installation of vapor barrier refer to Section 07 2600, Vapor Barriers.

Reglets and Rebates:

Form reglets and rebates in concrete to receive flashing, frames and other equipment as detailed and required. Coordinate dimensions and locations required with other related Work. If concrete slabs on grade adjoin a wall or other perpendicular concrete surface, form a reglet in wall to receive and carry horizontal concrete Work. Reglet shall be full thickness of the slab and shall be 3/4 inch wide, unless otherwise indicated. Requirement does not apply to exterior walks, unless specifically indicated.

Screeds: Install screeds accurately and maintain at required grade or slab elevations after steel reinforcement has been installed, but before starting to place concrete. Install screeds adjacent to walls and in parallel rows not to exceed 8 feet on centers.

3.04 INSTALLATION

Conveying and Placing:

Concrete shall be placed only under direct observation of the Project Inspector. Do not place concrete outside of regular working hours, unless the Inspector has been notified at least 48 hours in advance.

Concrete shall be conveyed from mixer to location of final placement by methods that will prevent separation or loss of materials.

Concrete shall be placed as nearly as practicable to its final position to avoid segregation due to re-handling or flowing. No concrete that has partially hydrated or has been contaminated by foreign materials shall be placed, nor shall re-tempered concrete or concrete which has been remixed after initial set be placed.

In placing concrete in columns, walls or thin sections, provide openings in forms, elephant trunks, tremies or other recognized devices, to prevent segregation and accumulation of partially hydrated concrete on forms or metal reinforcement above level of concrete being placed. Such devices shall be installed so that concrete will be dropped vertically. Unconfined vertical drop of concrete from end of such devices to final placement surface shall not exceed 6 feet.

Concrete shall be placed as a continuous operation until placing of panel or section is completed. Top surfaces of vertically formed lifts shall be level.

Concrete shall be thoroughly consolidated by suitable means during placement, and shall be thoroughly worked around reinforcement and embedded fixtures and into corners of forms.

Where conditions make consolidation difficult or where reinforcement is congested, batches of mortar containing same proportions of cement, sand, and water as provided in the concrete, shall first be deposited in the forms to a depth of at least one inch.

Cold Weather:

Provide adequate equipment for heating concrete materials and protecting concrete during freezing or near-freezing weather. All ground with which concrete is to come in contact shall be free from frost. No frozen materials or materials containing ice shall be used.

The temperature of concrete at the time of placement shall not be below the minimum temperatures given in Table 3.1 of ACI 306.1.

Concrete shall be maintained at a temperature of at least 50° F. for not less than 72 hours after placing or until it has thoroughly hardened. Cover concrete and provide

sufficient heat as required. When necessary, aggregates shall be heated before mixing. Special precautions shall be taken for protection of transit-mixed concrete.

Hot Weather:
Concrete to be placed during hot weather shall comply with the requirements of ACI 318, Section 5.13.
Maintain concrete temperatures indicated in Table 2.1.5 of ACI 305R to prevent the evaporation rate from exceeding 0.2 pound of water per square feet of exposed concrete per hour.
Cool concrete using methods indicated in ACI 305R Appendix B.
Place and cure concrete as specified in ACI 305R Chapter 4.
Compaction and Screeding:
Tamp freshly placed concrete with a heavy tamper until at least 3/8 inch of mortar is brought to surface. Concrete shall then be tamped with a light tamper and screeded with a heavy straightedge until depressions and irregularities are eliminated, and surface is true to finish grades or elevations. Remove excess water and debris.
Where slabs are to receive separate cement finish or mortar setting bed, continued tamping to raise mortar to surface is not performed. Laitance shall be removed by brushing with a stiff brush or by light sandblasting to expose clean top surface of coarse aggregate.

Floating and Troweling:
When concrete has hydrated sufficiently, it shall be floated to a compact and smooth surface. After floating, wait until concrete has reached proper consistency before troweling. Top surfaces shall receive at least 2 troweling operations with steel hand trowel. Prior to and during final troweling, apply a fine mist of water frequently with an atomizing type fog sprayer. Omit troweling for slabs to receive a separate cement finish. For interior finish slabs, final troweling shall provide a hard, impervious, and non-slip surfaces, free from defects and blemishes. Finished surface shall be within tolerances indicated in Article 3.02. Avoid burnishing. Do not add cement or sand to absorb excess moisture.

Exterior Paving and Cement Walks: Finish as specified above, except surface shall be given a non-slip broom finish to match Sample reviewed by the ARCHITECT.
Vertical concrete surfaces shall be finished smooth and free from marks or other surface defects.

3.05 CURING

Length of time, temperature and moisture conditions for curing concrete shall be in accordance with ACI 318, Section 5.11.
Forms containing concrete, top of concrete between forms, and exposed concrete surfaces after removal of forms shall be maintained in a thoroughly wet condition for at least 7 consecutive days after placing. If weather is hot or surface has dried out, spray surface of concrete slabs and paving with fine mist of water, starting not later than 2 hours after final troweling and continuing until sunset. Surface of finish shall be kept continuously wet until curing medium has been installed. Immediately after finishing, monolithic floor slabs shall be covered with curing paper. Paper shall be lapped 4 inches at joints and sealed with waterproof sealer. Edges shall be cemented to finish. Repair or replace paper damaged during construction operations.

When curing slabs with proactive water vapor emission and alkalinity control system: Coordinate and schedule application of curing compound with concrete pour schedule, while conforming to manufacturer's application instructions.
When the surface of the concrete has hardened sufficiently to sustain foot traffic pre-cure slabs with liquefied product application following manufacturer's written instructions. Application shall be by trained applicators.
Monitor Environmental Conditions: Set up weather station 20 to 30 inches above freshly placed concrete. Record temperature, humidity and wind velocity measurements at 15 minute maximum intervals.

Calculate Evaporation Rate: Use recorded weather information in combination with nomograph per ACI 308R, Figure 4.1, Guide to Curing Concrete, to evaluate relevant evaporation rate. When the bleed water rate of the concrete is approximately equal to the surface water evaporation rate, spray curing compound material throughout surface of slabs and decks, following manufacturer's written instructions. Application shall be by trained applicators. Perform the following tests at least 28 days after placement of concrete and prior to floor covering installation. Submit to OAR test results indicating locations that do not comply with scheduled flooring installation requirements.
Calcium chloride testing per ASTM F1869.
Relative humidity testing per ASTM F2170.
Alkalinity testing per ASTM F710.
Perform concrete bond layer humidity meter testing to determine substrate surface acceptability.
Areas emitting moisture and alkalinity at rates exceeding floor covering manufacturer's published ASTM F1869 limits, shall receive a corrective coating, at no cost to the OWNER, as follows:
Mask and protect adjacent walls and floor surfaces from effects of scarification and application of remedial treatment.
Scarify slab surface in area of application by shot blasting or other method acceptable to corrective coating manufacturer.

Prepare and fill cracks, control joints and cold joints.
Apply two-component modified epoxy penetrant and coating with roller and squeegee over required treatment area; saturate surfaces to ensure a through mechanical bond.
Clean and fill divots, chips, voids and other surface irregularities with one hundred percent Portland cement based patching compound or cementitious fill.
Apply cementitious surfacing over coating in areas to receive resilient and wood floor coverings to facilitate adhesion; apply to a thickness of 1/8 inch.

3.06 FILLING, LEVELING AND PATCHING

Concrete slabs exhibiting high or low spots and indicated to receive resilient floor covering or soft floor covering, shall have surfaces repaired. High spots shall be honed, or ground with power-driven machines to required tolerances. Low spots shall be filled with latex underlayment, installed in strict accordance with manufacturer's written recommendations.
Holes resulting from form ties or sleeve nuts shall be solidly packed, through exterior walls, by pressure grouting with cement grout, as specified. Grouted holes on exposed surfaces shall be screeded flush and finished to match adjoining surfaces.

Cement Base: Cement base shall be of the height, thickness, and shape detailed. Base shall be reinforced with one inch mesh, 18 gage, zinc-coated wire fabric. Base finish mixture shall be one part Portland cement, 2 parts of fine aggregate and one part pea gravel. Colored cement base shall include a chemically inert mineral oxide pigment in the mix.

3.07 FINISHING

Soda and Acid Wash: Concrete surfaces to receive plaster, paint or other finish, and which have been formed by oil coated forms, shall be scrubbed with a solution of 1-1/2 pounds of caustic soda to one gallon of water. Surfaces where smooth wood or waste molds have been furnished shall be scrubbed with a solution of 20 percent muriatic acid. Wash with clean water after scrubbing.

Sacking: Exposed concrete curbs, walls, and other surfaces shall be sacked by an application of Portland cement grout, floated, and rubbed. Sacking shall not be performed until patching and filling of holes has been completed. Entire sacking operation for any continuous area shall be started and completed within the same day. Mix one part Portland cement and 1-1/2 parts fine sand with sufficient water to produce a grout having consistency of thick paint. Wet surface of concrete sufficiently to prevent absorption of water from grout. Apply grout uniformly with a brush or spray gun, then immediately float surface with a cork or other suitable float, scouring wall vigorously. While grout is still plastic, finish surface with a sponge-rubber float, removing excess grout. Allow surface to dry thoroughly, then rub vigorously with dry burlap to completely remove dried grout. No visible film or grout shall remain after rubbing with burlap.

Sandblasting: Exterior concrete surfaces to receive stucco dash coat finish, where plywood or other smooth forms have been furnished, shall be uniformly sand-blasted with sharp quartz sand under sufficient air pressure to remove dirt, form oil and other foreign materials, and roughen surface to provide a proper bond. Such surfaces shall be thoroughly washed with clean water after sandblasting.

Abrasive: Concrete stair treads, landings, ramps and steps on interior and exterior of buildings, and interior exposed concrete floors in shop buildings shall receive an abrasive finish.

Floor Hardener: Exposed interior concrete floors throughout shall be treated with floor hardener.

Protect adjacent surfaces. Clean surfaces to receive treatment in accordance with manufacturer's instructions, ensuring that all stains, oil, grease, form release agents, laitance, dust and dirt are removed prior to application. Apply hardener in accordance with manufacturer’s instructions as soon as concrete is firm enough to work on after final troweling.

Cement Grout and Dry-Pack Concrete: Cement grout shall be mixed at the Project site and shall be composed of one volume of Portland cement and 2-1/2 volumes of fine aggregate. Materials shall be mixed dry with sufficient water added to make mixture flow under its own weight. When grout is used as a dry pack concrete, add sufficient water to provide a stiff mixture, which can be molded into a sphere.

Broom Finish: Exterior stair treads and landings shall be provided with a non-slip broom finish in addition to abrasive finish specified.

Abrasive Stair Nosing: Nosing shall be installed according to manufacturers written recommendations.

3.08 EXPANSION AND CONSTRUCTION JOINTS

Construction Joints: Details and proposed location of construction joints shall be as indicated on the Drawings, located to least impair strength of structure, in accordance with the following:

Thoroughly clean contact surface by sand blasting entire surface not earlier than 5 days after initial placement. A mix containing same proportion of sand and cement provided in concrete plus a maximum of 50 percent of coarse aggregate shall be placed to a depth of at least one inch on horizontal joints. Vertical joints shall be wetted and coated with a neat cement grout immediately before placing of new concrete. Should contact surface become coated with earth, sawdust, or deleterious material of any kind after being cleaned, entire surface shall be re-cleaned before applying mix.

Expansion Joints: Provide expansion joints where indicated in walks and exterior slabs. Space approximately 20 feet apart, unless otherwise indicated. Joints shall extend entirely through slab with joint filler in one piece for width of walk or slab. Joint filler shall be 3/8 inch thick, unless otherwise indicated.

Tooled Joints: Slabs, walks and paving shall be marked into areas as indicated with markings made with a V-grooving tool. Marks shall be round-edged, free from burrs or obstructions, with clean cut angles and shall be straight and true. Walks, if not indicated, shall be marked off into rectangles of not more than 12 square feet and shall have a center marking where more than 5 feet wide.

3.09 TESTING

Molded Cylinder Tests:

Inspector or testing lab personnel will prepare cylinders and perform slump tests. Samples for concrete strength shall be taken in accordance to ASTM C172. Each cylinder shall be dated, given a number, point in structure from which sample was obtained, mix design number, mix design strength and result of accompanying slump test noted. Separate tests of molded concrete cylinders obtained at same place and time shall be made at age of three days, seven days, and 28 days. A strength test shall be the average of the compressive strength of two cylinders, obtained from the same sample of concrete and tested at 28 days or at test age designated for determination of f'c.

Test cylinders shall be prepared at the Project site and stored in testing laboratory in accordance with ASTM C31, and tested in accordance with ASTM C39.

Core Test: At request of the ARCHITECT, cores of hardened concrete shall be cut from portions of hydrated structures for testing, in accordance with CBC and ASTM C42. Provide 4 inch diameter cores at representative places throughout the structure as designated by the ARCHITECT. In general, provide sufficient cores to represent concrete placed with at least one core for each 4,000 square feet of building area, and

at least 3 cores total for each Project. Where cores have been removed, fill voids with drypack, and patch the finish to match the adjacent existing surfaces.

Concrete Consistency: Measure consistency according to ASTM C143. Test twice each day or partial day's run of the mixer.

Adjustment of Mix: If the strength of any grade of concrete for any portion of Work, as indicated by molded test cylinders, falls below minimum 28 days compressive strength specified or indicated, adjust mix design for remaining portion of construction so that resulting concrete meets minimum strength requirements.

Air Content Testing: Measure in accordance to ASTM C173 or ASTM C231, for each composite sample taken in accordance to ASTM C172.

Defective Concrete:
Should strength of any grade of concrete, for any portion of Work indicated by tests of molded cylinders and core tests, fall below minimum 28 days strength specified or indicated, concrete will be deemed defective Work and shall be replaced or adequately strengthened in a manner acceptable to the ARCHITECT.
Concrete Work that is not formed as indicated, is not true within 1/250 of span, not true to intended alignment, not plumb or level where so intended, not true to intended grades and levels, contains sawdust shavings, wood or embedded debris, or does not fully conform to Contract provisions, shall be deemed to be defective Work and shall be removed and replaced. Concrete for Equipment Pads, Mechanical and Electrical Work: Unless otherwise indicated, strength shall have a minimum f'c = 3,000 psi. Exposed concrete shall be provided with a hand trowel finish with radius corners and edges. Form and place concrete where necessary as described in Section 03 1000 Concrete Forming and Accessories, and reinforced as described in Section 03 2000 Concrete Reinforcing. Calcium chloride shall not be furnished in any concrete mix provided for the installation of underground electrical conduits. For concrete encasement of more than one conduit, furnish 3/4 inch maximum aggregate.

3.10 CLEAN UP

Remove rubbish, debris and waste materials and legally dispose of off the Project site.

3.11 PROTECTION

Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 10 17 16

TELEPHONE ENCLOSURES

PART 1 GENERAL

1.01 SUMMARY

A. Equipment and materials used shall be standard components that are manufactured and available for purchase as standard replacement parts as long as the product is commercially available from the manufacturer.

1.02 QUALITY ASSURANCE

A. All tower installation, configurations, setup, program and related work shall be performed by electronic technicians thoroughly trained by the manufacturer in the installation and service of the equipment provided.

B. The tower shall be warrantied against any defects in material and workmanship under normal use for a period of five (5) years from date of installation, provided that manufacturer receives a completed "Installation Certification" certifying the date on which the system has been installed. An "Installation Certification" card shall be enclosed with every unit. In the event that no "Installation Certification" is received by manufacturer, the five (5) years will commence on the date of shipment by the manufacturer.

C. The blue light and faceplate light shall be warrantied against any defects in material and workmanship under normal use for a period of twenty-four (24) months from date of installation, provided that manufacturer receives a completed "Installation Certification" certifying the date on which the system has been installed. An "Installation Certification" card shall be enclosed with every unit. In the event that no "Installation Certification" is received by manufacturer, the twenty four (24) months will commence on the date of shipment by the manufacturer.

1.03 CERTIFICATIONS AND STANDARDS

A. The tower as an assembly shall be certified to:

1. UL Std 60950-1

B. The included LED blue light (model: ETP-EL or ETP-EL12/24) shall be certified to:

1. UL Std 1598

2. CSA Std C22.2 No. 250.0

PART 2 PRODUCTS

2.01 GENERAL

A. The tower shall:

1. Consist of a highly vandal-resistant free-standing steel emergency phone tower mount with an integrated flashing LED blue light.

2. Have an integrated LED faceplate light, mounted directly above the phone faceplate.

2.02 HARDWARE

A. The tower shall:

1. Be constructed of 0.25” thick steel and weigh approximately 300 lbs.

2. Measure:

a. Tower only: 10” W x 8” D x 108” H, with a 0.5” radius on each corner.

b. Tower and Blue Light: 10” W x 8” D x 114” H.

3. Utilize a high-gloss, multi-coat, corrosion-inhibitive coating that shall be applied to withstand prolonged exposure to hard environments.

a. Tower shall be sandblasted to SSPC-6 standards before a 2-3 mil layer of rust-inhibitive primer is applied.

b. Tower shall be hand sanded for smoothness before a second 2-3 mil layer of primer is applied.

c. Tower shall have a 2-3 mil layer of customer specified color coat applied.

d. Tower shall have a 1-2 mil layer of clear coat applied.

B. The tower base plate shall:

1. Be 2.0” above the tower base.

2. Be constructed of 0.75” thick A-36 Structural Steel.

3. Have a 4” diameter center hole for wiring access.

4. Have four 1” holes for anchor bolt attachment.

C. The tower wiring access opening shall:

1. Measure 9”H x 6.75” W.

2. Be located 15” above the base of the tower.

3. Have a flush cover plate that shall:

a. Be constructed of 0.25” thick steel.

b. Be held in place by two 1/4”-20 countersunk, tamper-resistant spanner screws.

D. The tower shall have an opening in the front to accommodate flush mounting an emergency phone. The phone opening shall:

1. Measure 10” H x 6.75” W.

2. Have six self-clinching #10-24 stainless steel threaded nuts to mount the emergency phone.

E. Directly below the tower phone opening, the tower shall have a section with a 30° downward slope from rear to front, spanning the depth of the phone opening to the full tower depth.

F. The tower shall have the word “EMERGENCY” emblazoned on all four sides in 3.25” high reflective white letters. Custom lettering, sizes and colors are available.

G. The tower blue light shall:

1. Be mounted at the top of the tower with three #10-24 tamper-resistant spanner screws.

2. Have a polycarbonate refractor lens assembly with a prismatic pattern to increase visibility at greater distances.

2.03 FUNCTIONALITY

A. Blue Light

1. The blue light shall remain lit at all times.

2. The blue light shall automatically flash 78 times per minute when triggered by the emergency phone.

3. The blue light shall have an illumination rating of 209 lumens (peak).

4. The blue light shall retain 70% of its initial output intensity after 50,000 hours of operation.

B. Faceplate Light

1. The faceplate light shall remain lit at all times.

2. The faceplate light shall have a concealed, ultra-bright LED design.

3. The faceplate light LEDs shall have no less than 50,000 hour lifetime.

2.04 POWER REQUIREMENTS

A. The tower shall be powered by one of the following power sources:

1. 12VDC – Nominal: 9 Watts

2. 24VDC – Nominal: 9 Watts

3. 24VAC – Nominal: 9 Watts

4. 120VAC – Nominal: 9 Watts

2.05 MANUFACTURED UNITS

A. The tower shall be a Talkaphone ETP-MT Emergency Telephone Tower.

PART 3 EXECUTION

3.01 INSTALLATION

A. The Contractor shall carefully follow instructions in documentation provided by the manufacturer to ensure all steps have been taken to provide a reliable, easy-to-operate system.

B. All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation.

C. The tower shall include 24-inch long J-bolts for mounting into a minimum 24” diameter by 36” deep concrete foundation. Depth to vary according to local regulations and other site-specific considerations.

D. The J-bolts shall protrude approximately 5 inches from the surface of the foundation.

END OF SECTION

SECTION 12 93 00
SITE FURNISHINGS

PART 1 GENERAL
BENCH Model: CR-196

1.1 DESCRIPTION

A. Section includes information, materials, and options for products manufactured by Victor Stanley, Inc. All specifications are subject to change. Contact manufacturer for details.

1.2 SUBMITTALS

A. Specifications Drawing: Detail drawing of product including overall dimensions and options.
B. Samples: Various component samples available upon request.
C. Qualifications: Installer must submit evidence of a successful installation history with comparable materials and designs specified.

1.3 DELIVERY, STORAGE, and HANDLING

A. Delivery: Deliver products to site in manufacturer's original, unopened containers and packaging. Upon delivery, examine packages immediately to ensure all products are complete and undamaged.
B. Storage: Store products in a protected, dry area in manufacturer's unopened containers and packaging.
C. Handling: Protect product's finish from damage during handling and installation.

1.4 COORDINATION

Coordinate with site work and other appropriate sections of the Specifications to maintain proper provisions of the work specified.
All site furnishings shall be laid out in the field and approved prior to installation.

PART 2 PRODUCTS

2.1 MANUFACTURER

Victor Stanley, Inc.
P.O. Drawer 330
Dunkirk, MD 20754 USA
Toll Free: (800) 368-2573 (USA & Canada)
Tel: (301) 855-8300 Fax: (410) 257-7579
E-mail: sales@victorstanley.com
Web site: http://www.victorstanley.com

2.2 BENCH

A. Type: Model CR-196 from the Classic Series

2.3 MATERIALS

A. Ductile iron end frames – all ductile iron castings come with a 10-year warranty against breakage; scrolled vertical steel slats are formed from 1/4” x 1-1/2” (6mm x 38mm) solid steel bars; scrolled vertical steel slats are welded to cross members of 1-7/8”(48mm) tubular steel; 1-5/16” (33mm) tubular steel rung used for additional support

2.4 OPTIONS

A. Standard lengths: 4ft (1.2 meters), 6ft (1.8 meters), and 8ft (2.4 meters) (custom lengths available)
B. Armrest(s)
C. Standard Colors: Bronze, Black, Green, Tavern Square Green, Teal, Blue, Burgundy, Red, Gray, White. Available with Optional Metallics: Silver, and Titanium, (custom colors available, including the RAL range).
D. Custom plaques: Engraved cast bronze plaques

2.5 FINISHES

A. All fabricated metal components are steel shotblasted, etched, phosphatized, preheated, and electrostatically powder-coated with TGIC polyester powder coatings. Products are fully cleaned and pretreated, preheated and coated while hot to fill crevices and build coating film. Coated parts are fully cured to coating manufacturer’s specifications. The thickness of the resulting finish coat averages 8-10 mils (200-250 microns).
B. In high salt abusive climates, hot-dip galvanizing before powder coating is available. Hot-dip galvanizing is performed for Victor Stanley, Inc. by an experienced qualified firm to which products are shipped for galvanizing. Hot-dip galvanizing includes an aggressive pre-treatment and immersion in a tank of charged liquid zinc at or around 860°F (460°C). The resulting surface is resistant to rust but has some unevenness resulting from the bonding of the zinc to the steel surface. As a result, the powder-coating surface finish over that galvanized surface may exhibit bumps, unevenness, and may not be as smooth as Victor Stanley, Inc.’s standard finish; this uneven and inconsistent finish is normal for hot-dip galvanizing. Most fabricated metal components and castings can be hot-dip galvanized, please contact manufacturer for details.

PART 3 EXECUTION

3.1 INSTALLATION

A. Clearance for 3/8” (10mm) anchor bolts (anchor bolts not provided by Victor Stanley, Inc.)
B. Mounting: It is not recommended to locate anchor bolts until bench is in place. This Victor Stanley, Inc. product must be permanently affixed to the ground. Consult your local codes for regulations.

3.2 PROTECTION

Protect products prior to installation by having them remain in the manufacturer’s packaging and container.

END OF SECTION

SECTION 12 93 00
SITE FURNISHINGS

PART 1 GENERAL
BIKE RACK Model: BRCS-105

1.1 DESCRIPTION

Section includes information, materials, and options for products manufactured by Secure Site Design, L.L.C. All specifications are subject to change. Contact manufacturer for details.

1.2 SUBMITTALS

Specifications Drawing: Detail drawing of product including overall dimensions and options.
Samples: Various component samples available upon request.
Qualifications: Installer must submit evidence of a successful installation history with comparable materials and designs specified.

1.3 DELIVERY, STORAGE, and HANDLING

Delivery: Deliver products to site in manufacturer's original, unopened containers and packaging. Upon delivery, examine packages immediately to ensure all products are complete and undamaged.
Storage: Store products in a protected, dry area in manufacturer's unopened containers and packaging.
Handling: Protect product's finish from damage during handling and installation.

1.4 COORDINATION

Coordinate with site work and other appropriate sections of the specifications to maintain proper provisions of the work specified.
All site furnishings shall be laid out in the field and approved prior to installation.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Secure Site Design, L.L.C.
P.O. Box 307,
Dunkirk, MD 20754 U.S.A.
Toll Free (USA & Canada): 1-888-ANTI-RAM (888-268-4726)
410-286-3375 : Fax 410-479-0175
info@securesitedesign.com
www.securesitedesign.com

2.2 STEEL BIKE RACK
Type: BRCS-105 from the Cycle Sentry™ Series

MATERIALS
2-3/8" (60mm) O.D. tubular steel
5" (127mm) surface mount flange

2.4 OPTIONS

Colors: Standard: Bronze, Black, Green, Tavern Square Green, Teal, Blue, Burgundy, Red,Gray,White. Available with Optional Metallics: Silver, and Titanium, (custom colors available, including the RAL range).

Mounting: Standard in-ground and Flanged surface

2.5 FINISHES

A. All powder coat finishes are done at Victor Stanley, Inc. (VSI) to match the VSI product line.

B. All fabricated metal components are steel shotblasted, etched, phosphatized, preheated, and electrostatically powder-coated with TGIC polyester powder coatings. Products are fully cleaned and pretreated, preheated and coated while hot to fill crevices and build coating film. Coated parts are fully cured to coating manufacturer's specifications. The thickness of the resulting finish averages 8-10 mils (200-250 microns).

C. In high salt abusive climates, hot-dip galvanizing before powder coating is available. Hot dip galvanizing is performed for Victor Stanley, Inc. by an experienced qualified firm to which products are shipped for galvanizing. Hot-dip galvanizing includes an aggressive pre-treatment and immersion in a tank of charged liquid zinc at or around 860°F (460°C). The resulting surface is resistant to rust but has some unevenness resulting from the bonding of the zinc to the steel surface. As a result, the powder-coating surface finish over that galvanized surface may exhibit bumps, unevenness, and may not be as smooth as Victor Stanley, Inc.'s standard finish; this uneven and inconsistent finish is normal for hot-dip galvanizing. Most fabricated metal components and castings can be hot-dip galvanized, please contact manufacturer for details.

D. All items available hot dip galvanized without powder coating.

PART 3 EXECUTION

3.1 INSTALLATION

A. Mounting:

a. Standard in-ground: It is not recommended to locate footing(s) until bike rack is in place. This Secure Site Design, L.L.C. product must be permanently affixed in the ground. Consult your local codes for regulations.

b. Standard surface: Clearance for 1/2" (13mm) anchor bolts (anchor bolts not provided by Secure Site Design, L.L.C.). It is not recommended to locate anchor bolts until bike rack is in place. This Secure Site Design, L.L.C. product must be permanently affixed to the ground. Consult your local codes for regulations.

3.2 PROTECTION

A. Protect products prior to installation by having them remain in the manufacturer's packaging and container.

SECTION 12 93 00
SITE FURNISHINGS

PART 1 GENERAL
TRASH CAN Model: A-24

1.1 DESCRIPTION

A. Section includes information, materials, and options for products manufactured by Victor Stanley, Inc. All specifications are subject to change. Contact manufacturer for details.

1.2 SUBMITTALS

A. Specifications Drawing: Detail drawing of product including overall dimensions and options.
B. Samples: Various component samples available upon request.
C. Qualifications: Installer must submit evidence of a successful installation history with comparable materials and designs specified.

1.3 DELIVERY, STORAGE, and HANDLING

A. Delivery: Deliver products to site in manufacturer's original, unopened containers and packaging. Upon delivery, examine packages immediately to ensure all products are complete and undamaged.
B. Storage: Store products in a protected, dry area in manufacturer's unopened containers and packaging.
C. Handling: Protect product's finish from damage during handling and installation.

1.4 COORDINATION

A. Coordinate with site work and other appropriate sections of the specifications to maintain proper provisions of the work specified.
B. All site furnishings shall be laid out in the field and approved prior to installation.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Victor Stanley, Inc.
P.O. Drawer 330
Dunkirk, MD 20754 USA
Toll Free: (800) 368-2573 (USA & Canada)
Tel: (301) 855-8300 Fax: (410) 257-7579
E-mail: sales@victorstanley.com
Web site: http://www.victorstanley.com

2.2 LITTER RECEPTACLE

A. Type: Model A-24 from the Seelsites™ Series
B. Patent: This product is covered by one or more of the following U.S. patents D458,431 S; D454,238 S; D441,932 S; D452,760 S; D483,538 S; D487,537 S; D487,538 S; D487,177 S, Canadian patents 88734; 96040 and the optional lock box U.S. patent 6,339,944 B1.

2.3 MATERIALS

A. 3/8” x 1” (10mm x 25mm) vertical solid steel bars; 1/4” x 2” (6mm x 51mm) horizontal solid steel band; 3/8” x 3” (10mm x 76mm) steel support bars; 16 gauge steel dome; 1” x 1” (25mm x 25mm) solid steel dome support; 1/4” x 1” (6mm x 25mm) solid steel dome mount; leveling feet with a 3/8” (10mm) diameter threaded steel shaft. Oil impregnated bronze bushings and stainless steel pivot pins for door movement, standard 3/8” (10mm) solid steel latch assembly or optional patented stainless steel keyed lock assembly.

B. 24 gallon (90 liters) capacity high density plastic liner [weight not to exceed 5 lbs.(2.27 Kg)]

a. Victory Stanley, Inc. plastic inner liners are molded on tooling designed for an owned by Victor Stanley, Inc. They offer maximum capacity and strength with lightweight construction using critical molded ribs, intergral handholds, and high strength materials. This minimizes handeling difficulty and facilitates easy emptying and storage while affording long service life.

2.4 OPTIONS

A. Lids: Shipped with welded canopy dome lid; available with optional welded canopy dome with stainless steel ashtray.

B. Security: Shipped with standard lockable latch; available with optional patented stainless steel keyed lock assembly.

C. Standard colors: VS Bronze, VS Black, VS Green, VS Tavern Square Green, VS Teal, VS Blue, VS Burgundy, VS Red, VS White, VS Gray (custom colors available, including the RAL range.)

D. Custom plaques and decals: Steel plaques in various sizes and pressure sensitive vinyl outdoor decals.

E. Mounting plate: Standard (1) anchor bolt hole; available with optional (3) anchor bolt holes.

F. Available with optional bottom plate cover.

2.5 FINISHES

A. All fabricated metal components are steel shotblasted, etched, phosphatized, preheated, and electrostatically powder-coated with TGIC polyester powder coatings. Products are fully cleaned and pretreated, preheated and coated while hot to fill crevices and build coating film. Coated parts are fully cured to coating manufacturer’s specifications. The thickness of the resulting finish averages 8-10 mils (200-250 microns).

B. In high salt abusive climates, hot-dip galvanizing before powder coating is available. Hot-dip galvanizing is performed for Victor Stanley, Inc. by an experienced qualified firm to which products are shipped for galvanizing. Hot-dip galvanizing includes an aggressive pre-treatment and immersion in a tank of charged liquid zinc at or around 860°F (460°C). The resulting surface is resistant to rust but has some unevenness resulting from the bonding of the zinc to the steel surface. As a result, the powder-coating surface finish over that galvanized surface may exhibit bumps, unevenness, and may not be as smooth as Victor Stanley, Inc.’s standard finish; this uneven and inconsistent finish is normal for hot-dip galvanizing. Most fabricated metal components and castings can be hot-dip galvanized, please contact manufacturer for details.galvanized, lids cannot, please contact manufacturer for details.

PART 3 EXECUTION

3.1 INSTALLATION

A. Clearance for 3/4” (19mm) square anchor bolt hole (anchor bolts not provided by Victor Stanley, Inc.). It is not recommended to locate anchor bolts until receptacle is in place. This Victor Stanley, Inc. product must be permanently affixed to the ground. Consult your local codes for regulations.

3.2 PROTECTION

A. Protect products prior to installation by having them remain in the manufacturer’s packaging and container.

END OF SECTION

SECTION 13 10 00
WATER FEATURE

PART 1 – GENERAL

1.1 SUMMARY

A. Water Feature Design Narrative

This specification covers the installation of the pond and related fountain work as shown on the drawings. Careful coordination between the Contractor and the Sculpture Artist will be required to successfully locate the fountain jets as needed at the base of the mustang hooves in the sculpture.

B. Description of Work

1. Complete the interactive water feature design and provide a Texas Engineered sealed construction drawing for review. This document shall be approved before purchase of construction can begin.

2. Furnish all labor, materials, apparatus, tools, equipment, transportation, temporary construction, and special or occasional services as required to make a complete working water feature installation, as shown on the approved drawings and described in these specifications.

3. The Plans accompanying this specification depicting this work are diagrammatic, intended mainly to indicate the scope of work to be done. It is the Installing Contractor's responsibility to verify site conditions and make appropriate adjustments to equipment locations. In all cases, where scales are shown, written dimensions shall take precedence over scaled dimensions.

C. Related Sections:

1. Division 01 - General and Special Conditions of the Contract
2. Division 03 - Concrete

1.2 SUBMITTALS – PRE BID

A. Contractor to furnish, without extra charge, a full submittal package, including sealed drawings, prior to installation of any of the elements related to this Section.

B. Substitutions of specified components must be approved by the project design team ten days before the bid date.

C. Submittals for "approved equal" items shall, where applicable, include the following data.

1. Manufacturer's shop drawings or catalog pages
2. Custom fabrication drawings
3. Performance characteristics
4. Materials
5. Finish
6. Certification of conformance with specified codes and standard specifications

D. Submittals of "approved equal" components may be rejected if:

1. Manufacturer's shop drawings or catalog pages are not included.
2. The component would necessitate the alteration of any portion of the plumbing, electrical, architectural, or structural design.
3. Dimensions vary from the specified component in such a manner that accessibility or clearances are impaired or the work of other trades is adversely affected.

E. Submittal Review

1. Review of Submittals is for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The review is not for determining the accuracy or completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, which remains the Contractor's responsibility. Review shall not constitute approval of safety precautions, or of construction means, methods, and techniques, sequences or procedures. Approval of a specific item shall not indicate approval of an assembly of which the item is a component.

1.3 QUALITY ASSURANCE

A. All workmanship and materials shall conform and comply with the requirements of building ordinances, codes, rules and regulations of all departments of Federal, State, Institution, and City having lawful jurisdiction over the work in this section.

B. When these specifications and/or drawings call for or describe materials, workmanship or construction of a better quality, higher standard or larger size than is required by the above mentioned rules and regulations, the provisions of these specifications and/or drawings shall take precedence over the requirements of said rules and regulations.

C. The Installing Contractor shall furnish, without extra charge, any additional material and/or labor required for compliance with these rules and regulations, although not mentioned in these specifications or indicated on the drawings.

D. All materials shall be new and shall conform to applicable standards in every case where such standards have been established for the particular material in question.

E. All work shall be executed by workmen skilled in the craft to which they are assigned.

F. Adequate supervision shall be provided to maintain high quality workmanship.

G. The Installing Contractor shall provide electrical equipment certifying approval by Underwriters Laboratories (UL) or equivalent testing agency.

1.4 REFERENCES

A. This installation shall comply with all applicable provisions of the latest edition of the following codes:

1. NEC National Electrical Code
2. UBC Uniform Building Code.
3. UPC Uniform Plumbing Code.

4. Texas Administrative Code – Public Interactive Water Features and Fountains; Title 25; Part 1; Chapter 265; Subchapter M 265.301-265.308

B. Materials furnished hereunder shall comply with the latest edition of applicable standard specifications published by the following organizations:

1. ASTM American Society for Testing and Materials.
2. NSF National Sanitation Foundation.
3. ANSI American National Standards Institute.
4. ASME American Society of Mechanical Engineers.
5. ASSE American Society of Sanitary Engineering.
6. AWWA American Water Works Association.
7. NEMA National Electrical Manufacturers Association.

1.5 SITE AND DRAWING EXAMINATION

A. Any Installing Contractor submitting a proposal for this work shall first examine the site of the proposed work and all conditions at the site that he may fully understand any facilities, difficulties, and restrictions attending the execution of the contract. No subsequent allowances shall be made because of omission, error, or negligence in connection with this provision.

B. Any Installing Contractor submitting a proposal for this work shall carefully examine the architectural and structural drawings and specifications for the work in this particular trade. Questions' pertaining to work that does not appear to be sufficiently detailed or explained, or pertaining to the true meaning of any part of the drawings or specifications, or discrepancies found existing in or between the specification and/or drawings, shall be referred to the General Contractor for clarification or correction.

1.6 COORDINATION

A. The Installing Contractor shall cooperate and coordinate the work under this section with that of other sub-contractors, as required, to effect a completely satisfactory installation consistent with the requirements and intent of the contract drawings and specifications, to avoid omissions and delays in the work.

B. The Installing Contractor shall furnish necessary materials in ample quantities as required to avoid delay in the progress of the work and shall so store them as to prevent interference with other work.

1.7 GENERAL INSTALLATION

A. Install and connect all equipment in accordance with manufacturer's instructions and recommendations unless otherwise noted. If specified installation is contrary to manufacturer's instructions, cease installation of affected components or systems, notify Project Manager and Architect/Engineer, and do not resume installation without clear instructions.

B. Protect all pipes, conduits, equipment and other parts of the work against damage by exposure to the weather during construction while stored and after installed in place.

C. Accurately locate items to be cast in concrete and rigidly support to resist loads imposed during concrete placement. Installing Contractor will be present during concrete placement.

1.8 DRAWINGS AND DOCUMENTATION SUBMITTAL – AFTER CONTRACT AWARD

A. Drawings for this work will consist of a set of plans, detail drawings and diagrams completed by the installing contractor. Other drawings may be added by the Architect or Water Feature Designer during the period of construction, as required for clarification or proper installation of equipment.

B. These drawings shall include:

1. Cover sheet indicating the location of the feature on the site. Coordinate with Landscape Architect for the base file for background imagery.
2. Project narrative describing the function of the water features
3. Plan and elevations of water feature
4. Pipe and conduit routing plan
5. Layout and location of the MEP within the water feature
6. Necessary details for construction of the water feature
7. Vault equipment plan and elevations
8. Piping and Instrument Diagram
9. Electrical One Line
10. Wiring diagrams and panel layouts
11. Bill of Material for the water feature
12. General notes

C. The drawings accompanying these specifications are to be considered as important and integral parts of same, and anything omitted from one and embodied in the other is to be as essential to the requirements of the contract and must furnished and installed by the Installing Contractor. Equipment and material locations may be distorted for clearness in presentation.

D. Drawings indicating fabrication details of custom components shall be submitted for approval prior to fabrication/installation and will be added to the as-built set of documents at the end of the project. This includes wiring diagrams and panel layout drawings.

E. The Installing Contractor or sub-Contractor shall keep on the job, one complete set of contract working drawings, on which shall be recorded any deviations or changes from such drawings made during construction. The record drawings shall show changes in size, type, capacity, material, device or piece of equipment, rerouting of any piping or conduit, or changes in other building services.

F. These drawings shall also record the location of concealed services, piping, conduit and other equipment, by indication of measured dimensions to each such line, from readily identifiable and accessible reference points.

G. Pictures showing the progress of installation shall be considered necessary and will be transferred electronically as part of the as-built documents.

1.9 SITE CONDITIONS

A. The Installing Contractor shall be responsible for the protection of the Owner's property from injury or loss due to his work. All damage to existing property (buildings, utilities, pavement, etc.) or planting (trees, shrubs, lawn or ground cover) caused by the Installing Contractor during his operation or as a result of malfunction of installed work during the guarantee shall be repaired at the Installing Contractor's expense.

B. The Installing Contractor shall fully inform himself regarding any space limitations and unusual requirements, for the installation of all materials and work furnished under this section. Although the location of equipment may be shown on the drawings in certain positions, the Installing Contractor shall also

be guided by the Architectural details and conditions at the job, correlating his work with that of the other sections.

1.10 PERMITS AND FEES

A. Permits: The Installing Contractor shall secure and pay for all permits, inspections, and certificates of inspection, of any governmental and inspection body having jurisdiction over all or any part of the work included under this section, and/or such inspections, etc., required by these specifications.

B. Fees: The Installing Contractor shall secure and pay for all fees and assessments in connection with the work under this contract, and shall include this cost in his bid and contract price.

1.11 CONTRACTOR QUALIFICATIONS & WARRANTY

A. The installing water feature contractor shall provide written evidence, upon request from the owner, demonstrating the following items:

1. The installing water feature contractor must demonstrate that they have been in the commercial water feature construction business for at least five years prior to the date of bid. To qualify, the installing contractor must provide a list of a minimum of five architectural water features they have installed per year for the past five years. A qualifying project means that the installing water feature contractor installed, not subcontracted the work, the MEP system for the feature (pumps, filters, chemical control, pipes, discharges, controls, and water feature lights (if applicable). Also to qualify, the installation price of the MEP portion, as described above, must be no less than $100,000.00 per each feature.

2. The water feature contractor shall also demonstrate construction experience with Public Interactive Water Features, as defined by the Texas Administrative Code, Title 25. The installing water feature contractor shall have completed at least five Public Interactive Water Features, and up to one of the five Public Interactive Water Features can be under construction at the time of bid. A qualifying project must have a MEP (as described above) installation cost of at least $500,000.00.

3. The installing water feature contractor must demonstrate design experience with Public Interactive Water Features, as this project will be a design build feature. The installing contractor must provide engineering documents for the installation of the water feature. These drawings must be signed and sealed by a registered firm and engineer in the State of Texas. If the contractor will not be providing these services in-house, the contractor must provide the name and location of the engineering firm providing said documents. The engineering firm must provide documentation indicating that they have provided signed and sealed documents for at least five public interactive water features. Installing Contractor shall have a continuous 5 year record of no less than 5 completed MEP projects of designing and constructing custom public interactive water features, as defined by Texas Administrative Code Title 25, that have an equal or greater scope and cost.

B. In entering into a contract covering this work, the Installing Contractor accepts the specifications and drawings and guarantees that the work will be performed in accordance with the requirements of the specifications and drawings, or such modifications to said specifications and drawings, as may be made in the contract documents.

C. The Installing Contractor further guarantees that the workmanship and material will be of the best quality procurable and that none but experienced workmen, familiar with each particular class of work, will be employed.

D. The Installing Contractor further agrees to hold himself responsible for any defects which may develop in any part of the entire system, including equipment as provided for under this specification, due to faulty workmanship, design or material and to replace or make good, without cost to the Owner, any such faulty parts or construction which may develop at any time within one (1) year from the date of the final acceptance. Any repairs or replacements required because of defects, as outlined in this clause, are to be made promptly and approved in writing by the Architect or Owner.

1.12 CLEAN-UP

A. Upon completion of each work session, the Installing Contractor shall remove all unused equipment and implements of service, replace all barricades and safety fencing, and leave the entire area involved in a neat, clean, and acceptable condition as approved by the Owner.

B. All soiled, abraded or discolored surfaces of decorative water feature work shall be cleaned or polished, and left free from blemishes or defects.

1.13 OPERATION PERIOD

A. Prior to acceptance of the installation by the Owner, the Contractor shall demonstrate a concurrent ten day, fully automated, uninterrupted daily operation of not less than twelve hours for all systems provided under this Section.

B. The contractor shall supervise the operation of the equipment and be responsible for the proper operation and maintenance thereof and make no claim against the Owner for any damage to the equipment during such operation. The contractor shall make such changes, adjustments, or replacements of equipment as may be required to make the installation comply with the Specifications and Drawings

C. The costs of electricity, water and normal operational supplies during this operational period will be paid by the Owner.

1.14 MAINTENANCE MANUAL AND TRAINING

A. The Installing Contractor shall deliver to the Owner, in electronic format (PDF), the Operations and Maintenance Manuals, specific to this job, together with any additional information or manuals which would assist in the proper maintenance of equipment.

B. The Installing Contractor shall arrange and provide for the technical instruction of the Owner's maintenance personnel for such time as is reasonably required to acquaint them with the operation and maintenance of all equipment furnished or installed under this section. A training video shall be recorded and given to the owner as part of the as-built deliverables.

C. Furnish as-built drawings in electronic format (PDF and CAD) within 30 days of substantial completion of the water feature.

D. Custom PLC and Show program files will be provided (unlocked) to the owner as part of the as-built deliverables. The PLC programs will be notated to explain the function of the steps in the program. The owner agrees that any changes to the program before the warranty period is over will be made by the contractor, or the owner will accept responsibility for the damage caused by incorrect program changes.

PART 2 – COMPONENTS

The following sections detail the required function of control scenarios, and where appropriate, the specific components that shall be used for those functions. The Bill of Materials on the drawings is to be used in conjunction with this specification. The intent of the specifications is to establish a level of quality and performance and should be considered as guidance for all installed systems and components.

2.1 PROGRAMMING

A. The Installing Contractor is responsible for startup and tuning of the water feature. This includes the programming of the PLC and verification of the PLC/Show Programmer interface. Crystal Fountains will be contracted by the owner to provide the show programming.

B. A clock function programmed into the PLC will be created to allow the customer to assign show events to four (4) times during the day as well as each day of the week. This function will be available from the OIT interface on the control panel.

C. A control narrative shall be created by the installing contractor indicating how the PLC program will control the water feature equipment and screen shots of the screens developed for the OIT. This narrative will be submitted and approved before the control system is installed and commissioned.

2.2 CONTROLLER EQUIPMENT

A. All the system control functions for this water feature system will be programmed using an Allen Bradley Micrologix PLC controller and an Allen Bradley PanelView 800 - 7in touch screen operator interface terminal (OIT). Appropriate I/O modules for the discrete and analog functions will be specified by the installing contractor.

B. The controls design will include interfacing with an external Ethernet communication provided by the owner. All OIT information and commands shall be available through this Ethernet communication.

C. The show playback and storage unit shall be a Nicolaudie SLESA-UE7 and is used to playback the show sequences for all display functions (pumps and lighting). This controller will be used to control the VFD speed commands for all display pumps. Run permissive for the VFD's will come from the PLC system controller. Discrete inputs into the Nicolaudie SLESA-UE7 will be used to determine which shows are operating.

2.3 WATER LEVEL CONTROL

A. PLC Control System shall monitor and control the water level in the reservoir.

B. Water Level Control sensors shall use electrostatic capacitance to detect water level. Float switches or resistive probes will not be allowed.

C. The Water Level Control system will provide voltage to the required master control solenoid valve (located in the outside mechanical area at the RPZ). The master control solenoid will be automatically activated when the fill valve is activated. The master control solenoid will also be activated when the fill valve is activated in manual mode on the OIT. A timer will be used in the PLC program to limit the operation of the master valve in the manual mode. This timer duration shall be adjustable by the operator from the OIT.

D. Water level definitions:

4. Low Level Cutoff (LLCO) – Probes detect water level in the reservoir is TOO LOW and disables all pumps and basin lighting operating permissives and outputs. A RED lighted pushbutton on the OIT will indicate the LLCO and must be pressed to reset the LLCO condition.
5. Operational Water Level – During operation of the display feature, a sensor monitors the water level in the reservoir and energizes the solenoid operated fill valve and master valve until water level is adequate.
6. Static Water Level - When the display system is off, a sensor monitors the water level in the lower basin (or reservoir) and energizes the solenoid operated fill valve and master valve until water level is adequate to prevent the system from dropping to LLCO level at the start of display operation.

E. The Fill Sequence function can be manually controlled from the face of the OIT. This will allow the operator to manually energize or turn off the fill valve.

F. A manual bypass valve shall be installed to allow the rapid filling of the basin/reservoir. To use this valve, the manual water fill function must be engaged to activate the master supply solenoid valve.

G. A flow totalizing flow meter will be installed on the incoming water. The water usage will be recorded in the PLC in two forms and displayed on the OIT.

1. Record the total gallons of water starting with acceptance of the completed and commissioned feature.
2. An OIT resettable total that allows the operators to record water usage over a specific period of time.

2.4 VAULT HIGH ALARM

A. The vault sump will be equipped with a level switch that will detect excess water in the vault. This is independent of the level switches that control the sump pumps. The high alarm switch will independently signal the PLC that a High Water condition exists and the PLC will turn off the pumps and fill valves. A RED lighted pushbutton on the OIT will indicate the High Level Alarm and must be pressed to reset the alarm condition and restart the pumps.

2.5 PUMP CONTROL

A. The filter and display pumps shall be VFD controlled.

B. The filter pump will be given permission to operate from the PLC system.

Run permissive logic will include:
1. Low Level Cutoff Protection
2. Vault High Level cutoff
3. Suction Vacuum High cutoff
4. Freeze Protection

C. The display pumps will be given permission to operate from the PLC system.

Run permissive logic will include:
1. Low Level Cutoff Protection
2. Time Clock ON/OFF
3. Vault High Level cutoff
4. Suction Vacuum High cutoff
5. Wind Level
6. Freeze Protection

D. The pumps shall have an illuminated HAND/OFF/AUTO selector on the OIT. The switch shall be illuminated when run confirmation for that pump is received.

1. The HAND position: Shall bypass the time clock (see below) only. Low-water shutoff protection (see above) and high-suction pressure/clogged strainer lockout shall not be bypassed. This position is for manual pump operation and has a maximum manual run timer programmed into the PLC (adjustable from the OIT).
2. The OFF position: Shall unconditionally disable the pump.
3. The AUTO position: Shall allow pump operation according to PLC or Show programs.

2.6 FILTRATION

A. The filtration and water treatment functions will run 24hrs a day.

B. The filter pump will be VFD controlled and speed controlled from the PLC. The speed of the pump will be varied to maintain the correct flow for the prescribed turnover rate (<60min), regardless of filter backpressure. The Analog flow sensor input to the PLC will be used to determine the correct filter pump speed.

C. The OIT will have a backwash function screen that tells the PLC logic that the system is in backwash mode to make the appropriate control/monitor decisions. A manual flow indicator on the backwash pipe will be used to set the maximum backwash flow rate during the backwash function.

D. The flow signal from the flow sensor will be displayed on the OIT in gallons per minute (gpm).

E. Pressure transmitters on the influent of the sand filter will be used to determine the need for filter backwash.

F. The filter will not have an automatic backwash function.

2.7 UV STERILIZATION

A. The UV system will be sized to provide required sterilization at the filter flow rate.

B. The UV sterilizer system will not operate unless the filter system is in filter mode. If the UV system fails, the water display system permissive will be denied.

B. A special output will be used to detect a low level UV and trigger the alarm in the PLC. A RED lighted pushbutton on the OIT will indicate the UV failure and must be pressed to reset the alarm condition and restart the pumps.

2.8 WATER CHEMISTRY CONTROL

A. Chlorine levels and the pH of the water will be automatically controlled. Other water chemistry parameters will be manually controlled by the operators.

B. The installing contractor will coordinate with the owner to determine if they have a preferred water chemistry controller.

C. The installing contractor will coordinate with the owner to determine if they have a preferred sanitizer or pH control chemical.

D. If there is no owner preference for sanitizer control, a CalHypo erosion feeder shall be used for chlorine injection.

E. If there is no owner preference for pH control and if the potable makeup water has alkalinity of 80-120ppm use a CO2 gas system for pH control. If the alkalinity is greater than 120ppm use liquid muriatic acid.

F. The automated water treatment controller has internal setpoints used to monitor and adjust water chemistry. The water chemistry must be within these parameters or the system will go into alarm. This alarm is a discrete output on the controller and must be connected to the PLC. In a chemical alarm condition the display pumps will be shut off until the water chemistry is corrected. The filter system will continue to run during a chemistry alarm. Since the PLC must have capability to communicate via a network, this alarm can also be transmitted to a location outside the equipment vault.

G. There shall be no chemical storage systems in the vault. All chemical storage will be located near the vault in smaller dedicated vaults. Coordinate with the landscape architect for the location of these vaults. The chemical storage vaults must be ventilated and designed to minimize the corrosion of the chemicals on the metal components.

H. The water chemistry system will only operate when the system is in filter mode.

2.9 WATER SOFTENER

A. Determine by testing a sample of the potable makeup water on the site if a water softener is required. If the water hardness is over 750ppm, the use of a water softener is required.

B. The water softener shall be designed to fill the reservoir with low hardness water in about 8 hours. Typically a complete refill of the reservoir is after a complete draining and cleaning. A manual regeneration of the softener system will need to be initiated at the beginning of the complete maintenance cycle or the softener will have to regenerate during the reservoir refill.

C. If during normal operation the softener requires regeneration, a bypass valve will allow incoming potable water to bypass the softener valve and add makeup water to the reservoir. This volume of “hard” water is not anticipated to change the overall hardness of the reservoir significantly.

2.10 PUMP SUCTION – HIGH VACUUM LEVEL

A. Vacuum switches shall be used to monitors the vacuum pressure between the suction strainer and the pumps to detect excessive debris loading or a closed suction isolation valve. The specified suction pressure switches should be wired normally open and the PLC control system creates a 30 second time delay before the HIGH vacuum signal is latched, turning off the pump. A RED lighted pushbutton on the OIT will indicate the HIGH Vacuum and must be pressed to reset the alarm condition.

2.11 WIND MONITORING AND CONTROL

A. The PLC shall be used to monitor the wind velocity and using PLC logic to determine when various setpoints are reached.

B. The anemometer shall be mounted at least 8’ from the ground in a location the will allow the anemometer to experience wind representative of the wind at the water feature.

C. Wind speed setpoints shall be adjustable on the OIT. Three wind setpoints will be required as follows:

1. The first (lowest) wind speed setpoint shall reduce the water effect to a level that limits water loss. This shall be done by reducing the pump speed.
2. The second (middle) wind speed setpoint shall further reduce the water effect to a level that limits water loss. This shall be done by reducing the pump speed.
3. The third (highest) wind speed setpoint will turn off the display pumps.

D. The wind control system does not change the flow of the filter system.

E. The wind speed control program will trigger a change in pump peed after the wind exceeds the setpoint for 5 seconds. The reset of the system requires that the wind be below the setpoint for 30 seconds. The setpoint alarm timers in the PLC program shall be available on the OIT.

F. Current wind speed and wind speed alarms shall be indicated on the OIT.

2.12 EMERGENCY STOP PUSHBUTTON (E-STOP)

A. An illuminated momentary emergency stop pushbutton is located near the feature and is used to shut off the display pumps. The button shall have a normally closed contact which opens when the button is pushed.

B. To reset the system the pushbutton may be pressed in a sequence recognized by the PLC, a reset button on the OIT, or a remote reset from an external source.

C. The contractor will submit the details of the switch, mounting, and location for approval by the landscape architect.

2.13 FREEZE PROTECTION

A. A temperature transmitter will be located outside to detect temperatures the fall below a preset limit. An OIT settable dead band between trigger and reset shall be used to prevent the ice buildup during freezing weather.

B. When the setpoint is reached the PLC will perform the following functions:

1. The display pumps will be turned off and the run permission to the show player turned off.
2. Motorized ball valves on the discharge of each display pump will be opened allowing water in the effects to drain back to the holding tank.
3. The all ventilation fans will be turned off.

2.14 VENTILATION CONTROL

A. The vault, reservoir, and chemical storage vaults shall be ventilated. All ventilation blowers shall have ON/OFF control by the PLC. This allows the ventilation to be turned off during freezing conditions.

ELECTRICAL COMPONENTS

2.15 GENERAL

A. The sections below indicate a generic specification and usage description for many of the products used in this project. Specific performance, brands, and model numbers are listed on the drawings and in these

specifications. Where specific brands and model numbers are indicated, substitutions are allowed, but must be submitted and approved 10 days before bid due date. Other more generic products will list standards to be used in selecting the brand of products.

B. Equipment not listed within these specifications or on drawings but required for the complete installation of the water feature electrical system, shall be furnished by the Installing Contractor, unless otherwise specified.

2.16 SCOPE OF ELECTRICAL WORK

A. Provide a complete control system, custom designed, fabricated, and installed that integrates control of water feature mechanical/electrical systems, to produce the design intent of the Water Feature.

B. Controls shall be UL 508 listed and housed in the minimum of a NEMA12 enclosure (size as required). The PLC control system for this water feature shall be provided by the installing contractor.

C. The custom lighting controls for this interactive water feature shall be purchased from Crystal Fountains.

D. The controls designer should recognize the temperature, humidity, and corrosive nature of the vault environment and make accommodations appropriate to protect the control hardware.

E. The Installing Contractor must contact the design team at the start of the design, in order to initially discuss system requirements and control functions.

F. Wiring diagrams, panel layout, and a complete operational narrative of control system will be submitted to the design team before construction of the controls.

G. All control panels will be designed and built to allow convenient and organized termination of field wiring.

H. As-built drawings and programming will be delivered to the customer at the completion of the project.

I. All control relays to be socket mounted, with “on” indication.

J. Terminal blocks shall be spring type, DIN rail mounted. Each terminal block shall have a unique label and match the labeling on the wiring diagram.

K. All conductors and field terminations to be provided with labels at each connection which correspond to designation shown on control wiring diagrams.

L. Site start-up and tuning services are to be provided.

M. Maintenance requirements for all control related equipment, detailed operational descriptions of all control functions, and control system as-built wiring diagrams shall be included in Operations and Maintenance manual.

N. All fasteners outside the control enclosures will be stainless steel.

2.17 CUSTOM WATER EFFECT NOZZLE AND LED LIGHT

A. Deck Level Constant flow nozzle with integrated RGBACL LED Light.

B. Light shall be UL rated wet/dry up to 86° Fahrenheit.

C. All deck level fasteners shall be vandal resistant and be made of 316 pacified and pickled stainless steel. 316 pacified and pickled stainless steel is required to avoid rusting.

D. LED light lens shall be integrated and be constructed out of polycarbonate UV and abrasion resistant, impact resistant and yellowing resistant material and optically clear with a maximum of 4% light loss.

E. IP68 UL rated underwater LED High Fidelity LED 12-24VDC/68W light.

F. LED lamp and all associated LED components shall have a life span of 50,000 hours at LED lamp shall be mounted on an specially designed heat dissipating mounting plate and then attached to housing using thermally conductive heat transfer epoxy to dissipate heat created by the LED board, which if not addressed can affect the life of the LED board and driver.

G. Light shall be IP68 rated up to one meter in depth.

H. Light shall be 12-24VDC/68W RGBACL dimmable 512 DMX addressable.

I. Light shall have a lumen output of 1733.

J. Light shall work if the12-24VDC power is reversed.

K. If the DMX polarity is reversed the light will indicate if the DMX is not active.

L. Light shall be able to create tunable white light between 2000 to 8000 kelvin as well as 274 Trillion amount of colors including amber, cyan and lime.

M. Light will have Remote Device Management Technology (RDM) that allows bi-directional communication between LED light and system controller.

N. Light is comes standard in (18°) spot beam spread or optional (44°) flood versions.

O. Light comes with 16/5 STW submersible cable. CE markings and CSA, UL or ET approved

P. Lens shall be constructed out of polycarbonate UV and abrasion resistant, impact resistant and yellowing resistant material and shall be optically clear allowing for a maximum of 4% light loss.

Q. Gasket shall be water repellent silicone with an inorganic backbone and durable to 300° C and rated UL94 compliant

R. Light shall be serialized and traceable to all production tests.

S. Lights shall be tested using pressure decay at 15 PSI (1.1 bar) and certified by manufacturer. Pressure decay system is be capable of detecting 0.1 Pascal (0.000145 psi)

T. Construction of fixture shall be 316 pacified and pickled stainless steel.

U. Proof of 316 stainless steel to be confirmed withheld-held alloy reader (Buker or similar) and a supplemental confirmation report.

V. Light shall have 1 year limited warranty from manufacturer.

W. Manufacturer: Crystal Fountains

2.18 MOTORS

A. All motors to be NEMA Standard, rated for operation at 40 degrees Celsius ambient, of ample size to operate at their rated load at full speed, continuously, without causing excessive noise, vibration or temperature rise. All motors must be capable of being operated by a VFD.

B. All pump motors are 460 volts, three phase, 60 hertz, NEMA Design B, low current inrush and normal starting torque, TEFC, equipped with ball bearings, except as otherwise specified.

2.19 WIRE AND CABLE

A. Single Conductor

1. A minimum wire size of stranded 12awg for all field power wiring except as noted on drawings. Wire size as required in control panels.
2. NEC type XHHW-2, stranded copper, moisture and heat resistant thermoplastic insulated with nylon jacket. 90 degrees C temperature rating.

B. Multi-Conductor Cable

1. 14-3 Seoprene® 600V SEOOW; 14awg class k stranded bare copper per ASTM b-174
2. insulation: TPE insulation and jacket; 600v -50c to 105c ft2 water resistant

C. Bonding Wire

1. #8 copper bonding wire according to NEC. 68053. 24awg/4pair Cat5e enhanced shield water blocked gel filled

D. Multi-Conductor DMX Cable

1. Construction: 24awg/4pair Cat5e enhanced shield water blocked gel filled
2. Manufacturer: Beldon 7937A

2.20 GROUNDING

A. Unbroken ground wire (min. 12AWG) in all conduit systems serving equipment for a continuous positive electrical ground.

2.21 CONNECTORS AND MARKERS

A. Splicing and Terminating: Wire nuts or Mechanical compression connectors: Cast bronze body, silicon bronze bolt. Use Arlington 719DB, or equivalent, for connection to rebar grid as applicable per NEC code

B. Bonding clamps: All bronze/brass body and U-bolt. Thomas and Betts 3900 series or approved equal.

C. Cable ties: Thomas and Betts "Ty-Rap" or approved equal.

D. Field Wire markers: Thomas and Betts "E-Z Code" or approved equal. Every control conductor shall be identified at both ends with the wire markers that match the as-built wiring diagrams.

E. Splicing and insulating tape: As manufactured by 3M "Scotch" brand, application in accordance with manufacturer's recommendations.

2.22 POWER DISTRIBUTION EQUIPMENT

A. Equipment shall be as manufactured by Square D or equal. Refer to the Drawings for load requirements. Voltage and characteristics shall be as shown on the Drawings.

B. All enclosures shall be factory coated with gray enamel, constructed to NEMA standards and bear the UL label where applicable. Installing Contractor is to verify distribution selection with Electrical Consultant.

C. Molded case, trip indicating thermal-magnetic type breakers, 40 degrees C ambient temperature compensated, fixed mounting, with quick-break switching mechanism mechanically trip-free from the operating handle and conforming to applicable NEMA AB-1 Specifications. Refer to Drawings for trip/frame and poles required. Square-D QO or equivalent.

D. Ground fault current-interrupting circuit breakers, where indicated shall meet the requirements for molded case, thermal-magnetic circuit breakers and shall contain in addition a ground fault sensing circuit which shall trip the breaker whenever an imbalance of five milliamps between line and neutral is detected. Square-D QO or equivalent.

E. Breakers may be co-located in the water feature control panel.

2.23 CONDUIT AND RACEWAY

A. ALL conduits from outside the vault shall enter a nonmetallic wire way before distribution of the wiring to the control enclosures. The wire way shall be drained to the sump to prevent any moisture from entering the control enclosures. Drains or weep holes shall be used at the lowest point in the conduit run (in the equipment space) to allow incidental water in the conduit to drain.

B. Lighting wiring shall have a dedicated conduit from the light in the water effect niche to the vault.

C. Rigid non-metallic conduit (PVC):

1. Rigid polyvinylchloride conduit
2. UL listed for exposed and direct burial applications and for 90 degrees C conductor insulation.
3. Fittings: Molded PVC, slip on, solvent weld type as furnished by the conduit manufacturer.

D. Liquid-tight flexible conduit

- Conduit: Non-metallic, PVC jacket and core, conforming to UL standards and NEC Article 351B
- Fittings: Non-metallic, nylon, conforming to UL standards.

E. Surface raceway

1. PVC or fiberglass construction, NEMA1, screwed cover, conforming to UL standards.

2.24 SUPPORT DEVICES

A. Provide all necessary inserts, fasteners, clamps, rods, channels, straps, bolts, nuts and washers.

B. Supporting devices shall be as manufactured by Unistrut or equal as recommended for the application.

2.25 CONCRETE PENETRATIONS

A. Where conduit penetrates a concrete surface (without a cast-in-place waterstop) a modular EPDM link type seal will be used. Stainless steel fasteners will be used. Cast-in-place plastic sleeves may be used, as well as cored holes. All cored holes will be waterproofed before link seals are installed. Consult structural engineer before coring holes in any surface. Before backfilling or project completion, waterproof non-expansive grout will be used to fill in the remaining core space.

B. Conduit that uses a waterstop flange to seal a penetration through concrete may use a plastic flange glued to the pipe or fitting. The plastic flange will be 2 times the nominal pipe diameter and glued to the pipe or fitting on both sides of the flange using a two-part methacrylate adhesive designed for structural bonding of thermoplastic.

C. A bulkhead plate may be constructed with a concentrated array of conduit connections. This bulkhead will be made of PVC and have socket type connections. No male adapters are allowed.

PLUMBING COMPONENTS

2.26 GENERAL

A. The sections below indicate a generic specification and usage description for many of the products used in this project. Specific performance, brands, and model numbers are listed on the drawings and in these specifications. Where specific brands and model numbers are indicated, substitutions are allowed, but must be submitted and approved 10 days before bid due date. Other more generic products will list standards to be used in selecting the brand of products.

B. Equipment not listed within these specifications or on drawings but required for the complete installation of the water feature plumbing system, shall be furnished by the Installing Contractor, unless otherwise specified.

2.27 SCOPE OF PLUMBING WORK

A. Furnish all labor, materials, apparatus, tools, equipment, transportation, temporary construction, and special or occasional services as required to make a complete working plumbing installation, as shown on the Drawings and described in these Specifications.

B. The custom water effects/lighting for this interactive water feature shall be purchased from Crystal Fountains.

C. Water Feature display systems including pumps, valves, piping and specialties.

D. Water Feature filtration systems including filters, media, pumps, valves, piping, and specialties.

E. Water Feature water treatment systems including automated controls, metering pumps, chemicals, valves, piping, tubing, and related accessories.

F. Water Feature plumbing services including water and storm to designated points of connection with site utilities.

G. Mechanical supporting devices for suspension and support of piping and equipment.

H. Concrete housekeeping pads as required or as indicated on the Drawings.

I. Grates and frames.

J. Waterproofing

K. Ventilation and associated ducting as required.

L. All special tools for proper operation and maintenance of the equipment provided under this section.

2.28 PUMPS

A. The pumps and all accessories furnished shall be suitable for the services specified. The pumps shall be capable of continuous operation in the arrangement shown at any flow within 10 percent of the specified capacity without cavitation resulting from the design of the impeller.

B. Three phase pumping equipment shall be capable of continuous (24/7/365), intermittent, and variable speed operation. Single phase pumping equipment shall be capable of continuous (24/7/365) operation.

C. All non-corrosion resistant wetted components of the pumps shall be coated with a long lasting and replaceable coating.

D. The vault shall be equipped with two sumps pumps to provide redundant protection. Pumps shall be Bell and Gossett 1DS, 1/2HP, 120vac.

2.29 FILTERS

A. The filter and all accessories furnished shall be suitable for the services and of a type specified on the drawings.

B. Filter size shall be based on its rated flow capacity respective to the total volume of water contained within water feature. Minimum rated filter flow capacity in gallons per minute (GPM) shall be adequate turnover all of the water in the water features within 1 hour.

C. Sand filter flow ratings shall not exceed 15GPM per square foot of filter media surface. Sand filter shall be provided with valves capable of controlling backwash, flush, drain, and filtering modes.

D. Filters shall be furnished with filter media and all accessories required providing a complete and operational filter system. Media shall be as specified by filter manufacturer.

E. A section of clear pipe will be installed in the backwash discharge to monitor the effectiveness of the backwash cycle. This pipe will be replaceable using unions/flanges at either end.

2.30 STRAINERS

A. Discharge strainers shall be used on all display pump discharges to the water effects.

B. Discharge strainers shall be Thompson MLS-8 with a 300micro stainless steel strainer.

C. A spare discharge strainer screen will be provided for each display pump strainer.

D. A common suction strainer shall be used for the main suction manifold. This eliminates the need for individual pump strainers.

E. The main suction strainer shall be a VAF Ultra Strainer Pro VAF0US-16x16.

F. Isolation valves shall be used on both sides of the strainers.

2.31 CUSTOM WATER EFFECT NOZZLE AND LED LIGHT

A. Deck Level Constant flow nozzle with integrated RGBACL LED Light. Reference datasheet Q89381000

B. Water level independent nozzle assembly with integral LED light in the middle center that produces large column of water.

C. Openings on Q89381000 shall be no larger than 3/8" in order to adhere to CCDEH foot friendly safety standards.

D. Water column is produced through 1 circle, diameter of 1 feet containing a total of 25 (0.09 mm).

E. Water column shall be between 10 ½" and 10' in diameter based on height.

F. Light specification in Section 2.17.

G. All deck level fasteners shall be vandal resistant and be made of 316 pacified and pickled stainless steel. 316 pacified and pickled stainless steel is required to avoid rusting.

H. LED light lens shall be integrated and be constructed out of polycarbonate UV and abrasion resistant, impact resistant and yellowing resistant material and optically clear with a maximum of 4% light loss.

I. Nozzle shall have 1 year limited warranty from manufacturer.

J. Manufacturer: Crystal Fountains

2.32 PRESSURE GAUGES

A. Pressure gauges shall be used to monitor the performance of the circulation systems. These will be placed where maintenance personnel can conveniently read the gauges. The gauges will be labeled with an engraved tag reflecting their usage and tag name identified on the P&ID in the drawings.

B. Gauges shall be a minimum of 63mm in diameter, glycerin filled, stainless steel case, brass movement.

2.33 WATER MAKEUP SYSTEM

A. The water makeup system refills the water feature with potable water. The water makeup system will be constructed of copper, bronze, or brass. Sweated copper fittings or pro-press compression construction is

acceptable. Each water feature will have a separate manual fill and automated valve. Hose bibs shall be ¾", 90degree operation, and be equipped with a vacuum breaker.

B. The automatic water makeup valve may be a motorized ball valve or a solenoid valve. If a solenoid valve is used the system shall be equipped with a water hammer arrestor.

C. All water makeup piping in the equipment vault shall be Type K copper.

D. The water feature control system will automatically activate the water makeup valve and the master control valve as required to maintain the adequate water in the feature. See Water Level Control narrative in Control Narratives section.

E. The master water makeup valve is located in a valve box near the water feature. Consult with the Landscape Architect for the location of the valve box.

2.34 WATER LEVEL STILLWELL

A. The water level measurement system shall be a stillwell located in the vault.

B. A 2 inch supply line from the reservoir into the vault shall have a 2 inch isolation ball valve.

C. A clear ¾" stillwell standpipe shall be used to mount the level measurement switches and provide a visual indication of the reservoir level.

D. A ½" ball valve below the incoming supply line will allow the draining of the clear still well and cycle testing of the level switches.

E. An air relief shall be located at the top of the clear stillwell pipe to prevent an overfilled reservoir from discharging into the vault.

2.35 VAULTS

A. Vaults will be constructed of concrete and may be cast-in-place or precast and will be designed for direct burial. Vaults shall be signed and sealed by a Texas Professional Engineer.

B. The vault elevations will be shown on the design drawings and located with Northing/Eastings on plan drawings.

C. Backfill around vaults with angular rock fill material suitably sized to prevent damage to the piping and conduit entering the vault.

D. Installing Contractor shall coordinate the vault installation with a structural engineer to insure that vault does not shift after installation.

E. Equipment vaults shall be sized and equipment layout designed to allow the convenient and comfortable service of the equipment.

F. Water proofing shall be applied to all the external surfaces of the vault. Seams in the vault must be detailed after assembly to create a waterproof seal. Cored holes must be re-waterproofed before installation of piping.

G. A concrete-pour access hatch will be installed with a minimum opening of 42”x42”

H. Vault access will be provided with a ladder with an up-safety bar. Ladder shall be fiberglass.

I. Before installing any equipment in the vault, provision shall be made to sump the vault in case of flooding. Coordinate with General Contractor to make sure the area will not flood during construction. Coordinate with landscape architect to make sure landscaping is not piled up around hatch or vent openings where water can run into the hatch or vent openings.

J. Ventilation penetrations will be at opposite ends of the vault with intake mounted low and exhaust mounted high. Minimum circulation rate of 2000cfm.

K. Coordinate with the Landscape Architect to determine the location of the ventilation piping at the surface.

L. Vault shall have a sump with two sump pumps controlled by individual float switches.

M. The vault floor should be sloped to prevent any standing water and promote drainage to the vault sump.

2.36 RESERVOIR

A. Reservoirs will be constructed of concrete and may be cast-in-place or precast and will be designed for direct burial. Reservoirs shall be signed and sealed by a Texas Professional Engineer.

B. The floor of the reservoir shall be sloped to the main suction pipe. The flowline of the main suction pipe will be mounted flush with the lowest point of the sloped floor to promote debris transport to the main suction strainer.

C. The filter return piping shall be mounted at floor level, creating a perforated manifold around the top of the sloped reservoir floor. The perforations push water across the sloped floor moving the debris to the main suction piping.

D. Drain return piping form the deck mounted water effect and drains shall discharge below operational water level in the reservoir.

E. The overflow to sanitary shall be sized to handle a 100 year rain event on the water feature deck.

F. Backfill around reservoir with angular rock fill material as specified by the reservoir manufacturer.

G. Installing Contractor shall coordinate the reservoir installation with structural engineer to insure reservoir does not shift after installation.

H. A concrete-pour access hatch will be installed with a minimum opening of 36”x36”. Coordinate with the Landscape Architect to assure proper orientation for the surrounding pavers.

I. Reservoir access hatch will be stainless steel and epoxy coated on the inside to reduce rust buildup the chlorinated environment.

J. Reservoirs shall have an additional access security grating designed and installed. The intent is to add a secondary barrier to the reservoir to prevent un-authorized entry. The grating system shall be fiberglass.

K. Reservoir access will be provided with a fiberglass ladder. All fasteners in the reservoir must be 316 stainless.

L. Ventilation penetrations will be at opposite ends of the reservoir with intake and exhaust in the ceiling.

M. Ventilation blower will be located outside the reservoir on the intake side of the vent piping. Minimum circulation rate of 100cfm.

N. Coordinate with the Landscape Architect to determine the location of the ventilation piping at the surface.

2.37 CHEMICAL STORAGE VAULTS

A. Chemical storage vaults shall be constructed on concrete.

B. The vaults will be sized as required to hold chemical storage equipment and positioned to provide adequate access for chemical refill.

C. Chemical vault access hatches will be stainless steel, sized for the application, and epoxy coated on the inside to reduce corrosion.

D. Chemical vaults shall have drains in the bottom.

E. Ventilation blowers will be located outside the vaults on the intake side of the vent piping. Minimum circulation rate of 100cfm.

F. Coordinate with the Landscape Architect to determine the location of the ventilation piping at the surface.

2.38 CONCRETE PENETRATIONS

A. Where piping penetrates a concrete surface, where a cast-in-place waterstop is not used, a modular EPDM link-type seal with stainless steel fasteners will be used. Cast-in-place plastic sleeves may be used, as well as cored holes. All cored holes will be waterproofed before link-seals are installed. Consult structural engineer before coring holes in any surface. Before backfilling or project completion, waterproof non-expansive grout will be used to fill in the remaining core space.

B. PVC piping that uses a waterstop flange to seal a penetration through concrete may use a plastic flange glued to the pipe or fitting. The plastic flange will be 2 times the nominal pipe diameter and glued to the pipe or fitting on both sides of the flange using a two-part methacrylate adhesive designed for structural bonding of thermoplastic.

C. All threaded connections imbedded in the concrete shall be bronze or stainless steel.

D. Any component penetrating the concrete, where there is any chance of standing water shall have a waterstop device to prevent water leakage.

2.39 VALVES

A. Valves shall be specified by size and type on the P&ID drawing. Specific valve brands and types shall be listed in the BOM on the drawings.

B. In water feature circulation systems, throttling and insolation valves 2 inches and below shall be ball type and of PVC construction. PVC valves shall be true-union type and the same brand shall be used throughout the water feature project.

C. Throttling and insolation valves 3 inches to 6 inches shall be butterfly type, flanged, with latching manual adjustment handles. Valves 8 inches and larger shall be butterfly type, flanged, with gear adjustment. All metal valves bodies and handles shall have a durable coating and all fasteners shall be stainless steel.

D. Check valves are used to prevent flow back from elevated system piping. 2 inches and below can be direct cemented to the piping under the condition that they can be easily serviced and internal parts replaced. 3 inches and larger check valves shall be wafer style and flange mounted. All fasteners will be stainless steel.

E. When solenoid controlled valves are used to control the flow of water in the system, electrical connections should be made as waterproof as possible. Valves shall be 24vac if used outside the equipment vault. Valves and fasteners must be of made of a corrosion proof material.

2.40 PIPE AND PIPE FITTINGS

A. Main distribution and drain piping from the vault/reservoir to the water feature shall be HDPE DR17 with fusion saddle fittings and HDPE/PVC transitions to the smaller (4" and less) piping.

B. Main suction piping shall be HDPE DR17

C. HDPE pipe installation will follow manufacturers recommended procedure.

D. HDPE pipe shall be used under all building structures.

E. All pipe and fittings shall be identified by the manufacturer to indicate material, class or type, size and pressure rating. All pipe and fittings should be Sch80 PVC or HDPE DR17. Where plastic pipe is not used, stainless steel, copper or brass will used.

F. SCH80 PVC may be used inside the equipment rooms after the HDPE transition through the walls. The main suction manifold shall be HDPE with fusion saddle fittings and HDPE/PVC transitions to the smaller (4" and less) piping.

G. Connections will follow manufacturer's installation instructions for both socket weld and threaded fittings. All PVC connections will be primed with appropriate solvent cleaner applied using the manufacturer's instructions. PVC socket welded pipe and fittings will use solvent cement conforming to ASTM-D2564, listed by NSF International for compliance with ASTM D 2564, NSF/ANSI Standard 14, and NSF/ANSI Standard 61 for use on potable water, drain, waste, vent and sewer applications.

H. No mechanical joint connections will be made underground without approval.

I. Threaded connections will be 125psi minimum. Flanged connections will be 150psi minimum. All fasteners will be stainless steel.

J. Copper tube and fittings will be type-L seamless, conforming to ASTM B88. Solder will be no-lead and water soluble flux will be used for all sweated connections.

K. Copper pro-press fittings may be used for water fill manifold or any copper connection requirement in the equipment space.

2.41 WATERPROOFING

A. Vault and Reservoirs will have an exterior waterproofing, typically supplied by the pre-cast supplier (BASF Sonneborn product or equivalent).

B. Site-applied waterproofing will be a liquid applied. Use Olympic Zeron 100.

2.42 CUSTOM FABRICATED COMPONENTS

A. All custom fabricated components will be made to the highest quality standards. The materials maybe stainless steel, brass, copper, or PVC as defined in the drawings for the project. Custom components must function as intended in the design and questions regarding functionality or construction should be resolved before fabrication begins.

2.43 EQUIPMENT VAULT SUPPORT DEVICES

A. Provide all necessary inserts, fasteners, clamps, rods, channels, straps, bolts, nuts and washers.

B. Supporting devices shall be as manufactured by Unistrut or equal as recommended for the application.

C. Provide all necessary inserts, fasteners, clamps, rods, channels, straps, bolts, nuts and washers.

D. Install pipe on stainless steel or fiberglass strut channel using stainless steel fasteners.

PART 3 – EXECUTION

3.1 GENERAL

A. Install and connect all equipment, piping, valves, and connections in accordance with manufacturers' instructions and recommendations.

B. Protect all pipes, equipment and other parts of the work against damage by exposure to the weather during construction while stored or installed in place.

C. Make all adjustments required for the proper operation of the plumbing system. Use Manufacturer's representatives or factory technicians where adjustments cannot be accomplished by the Installing Contractor's personnel.

3.2 FILTER SYSTEMS

A. Piping assembly shall be installed as shown on the manufacturer’s drawings and in accordance with the provisions of this Section appropriate to the pump, valves and fittings used.

B. Internal distribution piping and media shall be installed in strict accordance with written instruction from the manufacturer of the filter assembly after the tank has been set in place and all external piping is completed.

3.3 VALVE INSTALLATION

A. Do not install with valve stems below horizontal centerline.

3.4 PIPE INSTALLATION

A. Provide flanges or unions as necessary to allow removal and re-installation of any item of equipment or accessory without forcing, cutting, welding or soldering.

B. Protect all openings in piping during construction to prevent entrance of foreign matter.

C. Cut pipe and tubing ends square. Remove rough edges and burrs so that a smooth and unobstructed flow will be obtained. Remove cutting debris from pipe before assembly.

D. Close or short nipples should be used only where absolutely necessary to satisfy dimensional constraints.

E. Suction piping shall not be installed where air can become trapped, unless a bleed valve can be installed.

F. Unless otherwise noted, connections to equipment or accessories shall be screwed for sizes 2 inches and smaller, flanged for sizes 3 inches and larger.

G. Arrange exposed piping straight, parallel and perpendicular to the walls of the structure unless otherwise shown on the Drawings.

H. Make up threaded joints with Teflon tape and PTFE pipe thread sealant.

I. Remake leaking connections with new materials.

J. No male adapters shall be allowed in this installation.

K. Piping will be solvent welded using Weld-On P-70 primer (clear above & purple below ground) and 717 solvent cement or approved equivalent. Solvent cement will be gray in color, selected for the appropriate size of pipe and temperature range, and applied using the manufacturer's instructions. All excess cement shall be wiped from joint.

L. Discard cement when an appreciable change in viscosity takes place or if cement is lumpy or stringy. Do not thin. Cement must be used before the expiration date shown on the container.

M. Install detection tape along length of each underground pipe. When pipes are stacked install detection tape on top pipe.

3.5 PENETRATIONS

A. Core drilling for pipe penetrations shall be accomplished only at locations and in a manner approved by the structural engineer.

3.6 FLUSHING

A. All water pipe lines shall be flushed free of debris as follows:

1. Completely drain all piping and equipment.

2. Remove all construction debris and thoroughly sweep water feature surface.
3. Fill the system to the required capacity.
4. Circulate the water throughout the system for one hour.
5. Completely drain reservoir, piping and equipment and remove all debris which may have collected in suction and/or discharge strainers.

3.7 HOUSEKEEPING PADS

A. Pumps shall be erected on concrete housekeeping pads. Fastening of the motor frames to the pad shall be done in such a manner as to allow the motor/impeller unit to be easily removed without disconnecting the pump housing or associated piping.

3.8 PIPING AND EQUIPMENT SUPPORT

A. Provide equipment anchorage, pipe supports and hangers as necessary to maintain alignment, prevent stress and allow removal and maintenance of functional equipment. Piping shall not be supported by the equipment. All equipment anchorage, pipe supports and hangers shall be designed, installed and braced in accordance with UBC requirements to prevent movement.

B. Where several pipes occur at the same elevation, trapeze type hangers may be used.

3.9 EQUIPMENT IDENTIFICATION

A. Provide a securely attached permanently engraved nameplate for each piece of equipment, where appropriate, containing all data required to properly identify the equipment.

B. Provide a valve tag for each valve, as indicated on the P&ID, to provide information to correlate the valve with its function.

C. Install nameplates for gauge/control devices as shown on the Drawings.

D. Attach using stainless steel machine screws or stainless steel stranded safety wire.

3.10 LUBRICATION

A. Before any rotating equipment is put in operation for testing purposes, properly lubricate with lubricants recommended by the manufacturer. Further lubricate before final acceptance. Provide a complete schedule of lubrication of all rotating equipment within the equipment operation and maintenance manual

3.11 PIPING TESTS

A. Provide all temporary piping, pumps, and gauges necessary to conduct the specified tests (reference installation notes on drawings).

B. Conduct all tests before concealment of work and before backfilling.

C. Use water as test medium. Do not test piping with air or any other compressible gas. Vent air from all piping being tested before applying full test pressure.

D. Replace any part that leaks. Repeat test until criteria are met.

E. Do not subject any item to a test pressure greater than the pressure rating of the item at current temperature.

F. Underground piping shall be tested as follows:

1. Pressurize underground discharge piping to 50 psi prior to backfilling (spot backfilling to anchor piping may be done prior to pressurizing).
2. Pressurize all underground drain/suction piping to 20 psi prior to backfilling. (spot backfilling to anchor piping may be done prior to pressurizing).
3. Piping shall remain pressurized until all backfilling and concrete work in the area of the piping is completed.

G. Log pressure readings for all tests required above at the beginning and end of each test and on every working day between. Note the location and cause of any failures and method of repair on the daily log. Be prepared to submit log as part of As-built deliverables.

H. Testing of the completed systems as specified shall be witnessed by the approving authority.

I. The water feature designer shall not be responsible for water quality and water chemistry issues which may result in hard water scaling, high iron content, staining or any other chemical action or reaction to equipment or structures that may occur as a result of local water chemistry issues or improper water chemistry maintenance.

J. The water feature designer shall not be responsible for any incidental or consequential damages, deterioration or any other adverse effects to surrounding soft or hardscape, water feature structure, finishes, piping or any equipment as a result of water quality and chemistry issues and assumes that proper water analysis and appropriate treatment has been implemented prior to obtaining and installing water feature equipment.

K. Owner shall be solely responsible for performing any and all scientific testing deemed necessary to ascertain makeup water feature water quality and chemistry issues prior to constructing the water feature, and for selecting and providing all water treatment equipment and/or chemical additives which may be required to render the water suitable for the water feature application.

L. The water feature is designed to use potable water with the following water chemistry. Free chlorine: 1.0-1.2 ppm; pH: 6.8-7.6; total alkalinity: 70-100 ppm; $CaCO_3$ hardness: 150-200 ppm. The contractor will check the chemistry of the incoming water and notify the Water Feature Engineer if it does not meet the above standard.

3.12 GENERAL

A. Install all materials and equipment in accordance with NEC requirements and the manufacturers' instructions and recommendations.

B. Protect all conduits, conductors and equipment against damage by exposure to weather during construction while stored or installed in place.

C. Coordinate the location of outlets serving equipment furnished by other trades to allow space for necessary access, repair, removal and replacement.

D. Make all adjustments required for proper operation of the electrical system. Use manufacturers' representatives or factory technicians where adjustments cannot be accomplished by the Contractor's personnel.

E. Provide nameplates for all pressure and/or compound gauges, pressure switches, vacuum switches and other sensory or control devices to identify and provide information to correlate the device to operation and maintenance manual.

F. Provide nameplates on exterior of all electrical panels to identify panel and designate maximum voltage within panel.

G. Provide labels for all panel control switches and pilot lights to identify equipment controlled and function.

H. Provide labels in all power distribution panels designating device connected to each circuit breaker.

I. Provide labels on each time clock, control relay, contactor, and motor starter within control panels to identify and provide information to correlate the device to panel electrical drawings.

3.13 CONDUIT AND BOXES

A. Size all conduits in accordance with the NEC to accommodate quantities, sizes and types of conductors shown on the Drawings.

B. Conduit and boxes will be PVC with stainless steel fasteners, unless prohibited by code or otherwise specified in the Specification or Drawings.

C. Minimum conduit size shall be 1 inch unless indicated otherwise on the Drawings.

D. Arrange exposed conduit straight, parallel and perpendicular to the walls of the structure.

E. Group conduits in parallel horizontal or vertical runs wherever practical.

F. Protect all openings in conduit during construction to prevent entrance of foreign matter.

G. Cut conduit ends square. Remove rough edges and burrs.

H. Install all required fasteners, clamps, rods, channels, straps, bolts, nuts and washers to support raceway systems in accordance with the NEC. All material shall be stainless steel or fiberglass.

3.14 GROUNDING AND BONDING

A. Permanently ground and bond transformers, electrical cabinets, motors, conduits, and metal for the support of electrical equipment such as metallic piping systems and reinforcing steel.

B. Furnish all ground rods as required.

C. Grounding and bonding shall be in compliance with Article 250 of the NEC as a minimum.

D. All metallic parts in or around pools shall be grounded and bonded in accordance with Article 680 of the NEC.

PART 2 – COMPONENTS

The following sections detail the required function of control scenarios, and where appropriate, the specific components that shall be used for those functions. The Bill of Materials on the drawings is to be used in

conjunction with this specification. The intent of the specifications is to establish a level of quality and performance and should be considered as guidance for all installed systems and components.

2.1 PROGRAMMING

D. The Installing Contractor is responsible for startup and tuning of the water feature. This includes the programming of the PLC.

E. A clock function programmed into the PLC will be created to allow the customer to assign operational times up to four (4) times during the day as well as each day of the week. This function will be available from the OIT interface on the control panel.

F. A control narrative shall be created by the installing contractor indicating how the PLC program will control the water feature equipment and screen shots of the screens developed for the OIT. This narrative will be submitted and approved before the control system is installed and commissioned.

2.2 CONTROLLER EQUIPMENT

D. All the system control functions for this water feature system shall be programmed using an Allen Bradley Micrologix PLC controller and an Allen Bradley PanelView 800 - 7in touch screen operator interface terminal (OIT). Appropriate I/O modules for the discrete and analog functions will be specified by the installing contractor.

E. The controls design will include interfacing with an external Ethernet communication provided by the owner. All OIT information and commands shall be available through this Ethernet communication.

2.3 WATER LEVEL CONTROL

H. PLC Control System shall monitor and control the water level in the reservoir.

I. Water Level Control sensors shall use electrostatic capacitance to detect water level. Float switches or resistive probes will not be allowed.

J. Water Level switches shall be Omron E2K-L26MC1.

K. Water level definitions:

7. Low Level Cutoff (LLCO) – Probes detect water level in the reservoir is TOO LOW and disables all pumps and basin lighting operating permissives and outputs. A RED lighted pushbutton on the OIT will indicate the LLCO and must be pressed to reset the LLCO condition.
8. Operational Water Level – During operation of the display feature, a sensor monitors the water level in the reservoir and energizes the solenoid operated fill valve and master valve until water level is adequate.

L. The Fill Sequence function can be manually controlled from the face of the OIT. This will allow the operator to manually energize or turn off the fill valve.

2.4 VAULT HIGH ALARM

C. The vault sump will be equipped with a level switch that will detect excess water in the vault. This is independent of the level switches that control the sump pumps. The high alarm switch will independently signal the PLC that a High Water condition exists and the PLC will turn off the pumps and

fill valves. A RED lighted pushbutton on the OIT will indicate the High Level Alarm and must be pressed to reset the alarm condition and restart the pumps.

2.5 PUMP CONTROL

E. The filter and display pumps shall be VFD controlled.

F. The filter pump will be given permission to operate from the PLC system.

Run permissive logic will include:
5. Low Level Cutoff Protection
6. Vault High Level cutoff
7. Suction Vacuum High cutoff
8. Freeze Protection

G. The filter pump shall be a 1 HP Pentair Whisperflo operating at 240vac/3phase

H. The display pumps will be given permission to operate from the PLC system.

Run permissive logic will include:
7. Low Level Cutoff Protection
8. Time Clock ON/OFF
9. Wind Level
10. Freeze Protection

I. The display pump shall be a 3HP HCP L63 operating at 240vac/3phase.

J. The pumps shall have an illuminated HAND/OFF/AUTO selector on the OIT. The switch shall be illuminated when run confirmation for that pump is received.

4. The HAND position: Shall bypass the time clock (see below) only. Low-water shutoff protection (see above) and high-suction pressure/clogged strainer lockout shall not be bypassed. This position is for manual pump operation and has a maximum manual run timer programmed into the PLC (adjustable from the OIT).
5. The OFF position: Shall unconditionally disable the pump.
6. The AUTO position: Shall allow pump operation according to PLC or Show programs.

2.6 FILTRATION

G. The filtration and water treatment functions will run 24hrs a day.

H. The filter pump will be VFD controlled and speed controlled from the PLC.

I. The filter will not have an automatic backwash function.

J. The filter shall be a 24” Pentair Tagelus sand filter.

2.7 WATER CHEMISTRY CONTROL – EROSION FEEDER

A. The water treatment system will be a tablet chlorine erosion feeder with flow adjustment valve.

B. Water quality testing is performed manually.

C. The erosion feeder shall be a Pentair Rainbow 320 in-line tablet feeder.

2.8 PUMP SUCTION – HIGH VACUUM LEVEL

B. Vacuum switches shall be used to monitors the vacuum pressure between the suction strainer and the pumps to detect excessive debris loading or a closed suction isolation valve. The specified suction pressure switches should be wired normally open and the PLC control system creates a 30 second time delay before the HIGH vacuum signal is latched, turning off the pump. A RED lighted pushbutton on the OIT will indicate the HIGH Vacuum and must be pressed to reset the alarm condition.

C. The vacuum switch shall be a Honeywell 77342 17 N/O set at 17"Hg.

2.9 WIND MONITORING AND CONTROL

G. The PLC shall be used to monitor the wind velocity and using PLC logic to determine when various setpoints are reached.

H. The anemometer shall be mounted at least 8' from the ground in a location the will allow the anemometer to experience wind representative of the wind at the water feature.

I. Wind speed setpoints shall be adjustable on the OIT. One wind setpoint will be required as follows:

4. The wind speed setpoint will turn off the display pump.

J. The wind control system does not change the flow of the filter system.

K. The wind speed control program will trigger a change in pump peed after the wind exceeds the setpoint for 5 seconds. The reset of the system requires that the wind be below the setpoint for 30 seconds. The setpoint alarm timers in the PLC program shall be available on the OIT.

L. Current wind speed and wind speed alarms shall be indicated on the OIT.

2.10 FREEZE PROTECTION

C. A temperature switch will be located outside to detect temperatures the fall below a preset limit. An OIT settable dead band between trigger and reset shall be used to prevent the ice buildup during freezing weather.

D. When the setpoint is reached the PLC will perform the following functions:

4. The display pump will be turned off.
5. The ventilation fan will be turned off.

2.11 VENTILATION CONTROL

B. The vault shall be ventilated.

C. The ventilation blower shall have ON/OFF control by the PLC. This allows the ventilation to be turned off during freezing conditions.

D. The ventilation blower shall produce 100cfm in the vault and be located under the intake pipe cap.

ELECTRICAL COMPONENTS

2.12 GENERAL

C. The sections below indicate a generic specification and usage description for many of the products used in this project. Specific performance, brands, and model numbers are listed on the drawings and in these specifications. Where specific brands and model numbers are indicated, substitutions are allowed, but must be submitted and approved 10 days before bid due date. Other more generic products will list standards to be used in selecting the brand of products.

D. Equipment not listed within these specifications or on drawings but required for the complete installation of the water feature electrical system, shall be furnished by the Installing Contractor, unless otherwise specified.

2.13 SCOPE OF ELECTRICAL WORK

O. Provide a complete control system, custom designed, fabricated, and installed that integrates control of water feature mechanical/electrical systems, to produce the design intent of the Water Feature.

P. Controls shall be UL 508 listed and housed in the minimum of a NEMA12 enclosure (size as required). The PLC control system for this water feature shall be provided by the installing contractor.

Q. The custom lighting controls for this interactive water feature shall be purchased from Crystal Fountains.

R. The controls designer should recognize the temperature, humidity, and corrosive nature of the vault environment and make accommodations appropriate to protect the control hardware.

S. The Installing Contractor must contact the design team at the start of the design, in order to initially discuss system requirements and control functions.

T. Wiring diagrams, panel layout, and a complete operational narrative of control system will be submitted to the design team before construction of the controls.

U. All control panels will be designed and built to allow convenient and organized termination of field wiring.

V. As-built drawings and programming will be delivered to the customer at the completion of the project.

W. All control relays to be socket mounted, with “on” indication.

X. Terminal blocks shall be spring type, DIN rail mounted. Each terminal block shall have a unique label and match the labeling on the wiring diagram.

Y. All conductors and field terminations to be provided with labels at each connection which correspond to designation shown on control wiring diagrams.

Z. Site start-up and tuning services are to be provided.

AA. Maintenance requirements for all control related equipment, detailed operational descriptions of all control functions, and control system as-built wiring diagrams shall be included in Operations and Maintenance manual.

BB. All fasteners outside the control enclosures will be stainless steel.

2.14 MOTORS

C. All motors to be NEMA Standard, rated for operation at 40 degrees Celsius ambient, of ample size to operate at their rated load at full speed, continuously, without causing excessive noise, vibration or temperature rise. All motors must be capable of being operated by a VFD.

D. All pump motors are 240 volts, three phase, 60 hertz

2.15 WIRE AND CABLE

E. Single Conductor

3. A minimum wire size of stranded 12awg for all field power wiring except as noted on drawings. Wire size as required in control panels.

4. NEC type XHHW-2, stranded copper, moisture and heat resistant thermoplastic insulated with nylon jacket. 90 degrees C temperature rating.

F. Bonding Wire

2. #8 copper bonding wire according to NEC. 68053.

24awg/4pair Cat5e enhanced shield water blocked gel filled

G. Multi-Conductor DMX Cable

2.16 GROUNDING

B. Unbroken ground wire (min. 12AWG) in all conduit systems serving equipment for a continuous positive electrical ground.

2.17 CONNECTORS AND MARKERS

F. Splicing and Terminating: Wire nuts or Mechanical compression connectors: Cast bronze body, silicon bronze bolt. Use Arlington 719DB, or equivalent, for connection to rebar grid as applicable per NEC code

G. Bonding clamps: All bronze/brass body and U-bolt. Thomas and Betts 3900 series or approved equal.

H. Cable ties: Thomas and Betts "Ty-Rap" or approved equal.

I. Field Wire markers: Thomas and Betts "E-Z Code" or approved equal. Every control conductor shall be identified at both ends with the wire markers that match the as-built wiring diagrams.

J. Splicing and insulating tape: As manufactured by 3M "Scotch" brand, application in accordance with manufacturer's recommendations.

2.18 POWER DISTRIBUTION EQUIPMENT

F. Equipment shall be as manufactured by Square D or equal. Refer to the Drawings for load requirements. Voltage and characteristics shall be as shown on the Drawings.

G. All enclosures shall be factory coated with gray enamel, constructed to NEMA standards and bear the UL label where applicable. Installing Contractor is to verify distribution selection with Electrical Consultant.

H. Molded case, trip indicating thermal-magnetic type breakers, 40 degrees C ambient temperature compensated, fixed mounting, with quick-break switching mechanism mechanically trip-free from the operating handle and conforming to applicable NEMA AB-1 Specifications. Refer to Drawings for trip/frame and poles required. Square-D QO or equivalent.

I. Ground fault current-interrupting circuit breakers, where indicated shall meet the requirements for molded case, thermal-magnetic circuit breakers and shall contain in addition a ground fault sensing circuit which shall trip the breaker whenever an imbalance of five milliamps between line and neutral is detected. Square-D QO or equivalent.

J. Breakers may be co-located in the water feature control panel.

2.19 CONDUIT AND RACEWAY

F. ALL conduits from outside the vault shall enter a nonmetallic wire way before distribution of the wiring to the control enclosures. The wire way shall be drained to the sump to prevent any moisture from entering the control enclosures. Drains or weep holes shall be used at the lowest point in the conduit run (in the equipment space) to allow incidental water in the conduit to drain.

G. Lighting wiring shall have a dedicated conduit from the light in the water effect niche to the vault.

H. Rigid non-metallic conduit (PVC):

4. Rigid polyvinylchloride conduit
5. UL listed for exposed and direct burial applications and for 90 degrees C conductor insulation.
6. Fittings: Molded PVC, slip on, solvent weld type as furnished by the conduit manufacturer.

I. Liquid-tight flexible conduit

- Conduit: Non-metallic, PVC jacket and core, conforming to UL standards and NEC Article 351B
- Fittings: Non-metallic, nylon, conforming to UL standards.

2.20 SUPPORT DEVICES

C. Provide all necessary inserts, fasteners, clamps, rods, channels, straps, bolts, nuts and washers.

D. Supporting devices shall be as manufactured by Unistrut or equal as recommended for the application.

2.21 CONCRETE PENETRATIONS

D. Where conduit penetrates a concrete surface (without a cast-in-place waterstop) a modular EPDM link type seal will be used. Stainless steel fasteners will be used. Cast-in-place plastic sleeves may be used, as well as cored holes. All cored holes will be waterproofed before link seals are installed. Consult structural engineer before coring holes in any surface. Before backfilling or project completion, waterproof non-expansive grout will be used to fill in the remaining core space.

E. Conduit that uses a waterstop flange to seal a penetration through concrete may use a plastic flange glued to the pipe or fitting. The plastic flange will be 2 times the nominal pipe diameter and glued to the pipe or fitting on both sides of the flange using a two-part methacrylate adhesive designed for structural bonding of thermoplastic.

F. A bulkhead plate may be constructed with a concentrated array of conduit connections. This bulkhead will be made of PVC and have socket type connections. No male adapters are allowed.

PLUMBING COMPONENTS

2.22 GENERAL

C. The sections below indicate a generic specification and usage description for many of the products used in this project. Specific performance, brands, and model numbers are listed on the drawings and in these specifications. Where specific brands and model numbers are indicated, substitutions are allowed, but must be submitted and approved 10 days before bid due date. Other more generic products will list standards to be used in selecting the brand of products.

D. Equipment not listed within these specifications or on drawings but required for the complete installation of the water feature plumbing system, shall be furnished by the Installing Contractor, unless otherwise specified.

2.23 SCOPE OF PLUMBING WORK

A. Furnish all labor, materials, apparatus, tools, equipment, transportation, temporary construction, and special or occasional services as required to make a complete working plumbing installation, as shown on the Drawings and described in these Specifications.

B. Water Feature display systems including pumps, valves, piping and specialties.

C. Water Feature filtration systems including filters, media, pumps, valves, piping, and specialties.

D. Water Feature water treatment systems including automated controls, metering pumps, chemicals, valves, piping, tubing, and related accessories.

E. Water Feature plumbing services including water and storm to designated points of connection with site utilities.

F. Mechanical supporting devices for suspension and support of piping and equipment.

G. Concrete housekeeping pads as required or as indicated on the Drawings.

H. Grates and frames.

I. Waterproofing

J. Ventilation and associated ducting as required.

K. All special tools for proper operation and maintenance of the equipment provided under this section.

2.24 PUMPS

A. The pumps and all accessories furnished shall be suitable for the services specified. The pumps shall be capable of continuous operation in the arrangement shown at any flow within 10 percent of the specified capacity without cavitation resulting from the design of the impeller.

B. Three phase pumping equipment shall be capable of continuous (24/7/365), intermittent, and variable speed operation. Single phase pumping equipment shall be capable of continuous (24/7/365) operation.

C. All non-corrosion resistant wetted components of the pumps shall be coated with a long lasting and replaceable coating.

2.25 FILTERS

A. The filter and all accessories furnished shall be suitable for the services and of a type specified on the drawings.

B. Filter size shall be based on its rated flow capacity respective to the total volume of water contained within water feature. Minimum rated filter flow capacity in gallons per minute (GPM) shall be adequate turnover all of the water in the water features within 4 hours.

C. Sand filter flow ratings shall not exceed 15GPM per square foot of filter media surface. Sand filter shall be provided with valves capable of controlling backwash, flush, drain, and filtering modes.

D. Filters shall be furnished with filter media and all accessories required providing a complete and operational filter system. Media shall be as specified by filter manufacturer.

2.26 PRESSURE GAUGES

A. Pressure gauges shall be used to monitor the performance of the circulation systems. These will be placed where maintenance personnel can conveniently read the gauges. The gauges will be labeled with an engraved tag reflecting their usage and tag name identified on the P&ID in the drawings.

B. Gauges shall be a minimum of 63mm in diameter, glycerin filled, stainless steel case, brass movement.

2.27 WATER MAKEUP SYSTEM

A. The master water makeup valve is located in a valve box near the water feature. Consult with the Landscape Architect for the location of the valve box.

B. The water makeup valve shall be a ¾" bronze solenoid operated valve operating at 24vac.

2.28 WATER LEVEL STILLWELL

A. The water level measurement system shall be a stillwell located in the vault.

B. A 2 inch supply line from the reservoir into the vault shall have a 2 inch isolation ball valve.

C. A clear ¾" stillwell standpipe shall be used to mount the level measurement switches and provide a visual indication of the reservoir level.

D. A ½" ball valve below the incoming supply line will allow the draining of the clear still well and cycle testing of the level switches.

E. An air relief shall be located at the top of the clear stillwell pipe to prevent an overfilled reservoir from discharging into the vault.

2.29 VAULTS

A. Vaults will be constructed of concrete and may be cast-in-place or precast and will be designed for direct burial. Vaults shall be signed and sealed by a Texas Professional Engineer.

B. The vault elevations will be shown on the design drawings and located with Northing/Eastings on plan drawings.

C. Backfill around vaults with angular rock fill material suitably sized to prevent damage to the piping and conduit entering the vault.

D. Installing Contractor shall coordinate the vault installation with a structural engineer to insure that vault does not shift after installation.

E. Equipment vaults shall be sized and equipment layout designed to allow the convenient and comfortable service of the equipment.

F. Water proofing shall be applied to all the external surfaces of the vault. Seams in the vault must be detailed after assembly to create a waterproof seal. Cored holes must be re-waterproofed before installation of piping.

G. A diamond plate access hatch will be installed with a minimum opening of 42"x42"

H. Vault access will be a raise step in the bottom of the vault allowing operators to stand in the vault and service the equipment

I. Before installing any equipment in the vault, provision shall be made to connect the vault to sanitary sewer in case of flooding.

J. Ventilation penetrations will be at opposite ends of the vault with intake mounted low and exhaust mounted high. Minimum circulation rate of 100cfm.

K. Coordinate with the Landscape Architect to determine the location of the ventilation piping at the surface.

L. The vault floor should be sloped toward the floor drain.

2.30 VALVES

A. Valves shall be specified by size and type on the P&ID drawing. Specific valve brands and types shall be listed in the BOM on the drawings.

B. In water feature circulation systems, throttling and insolation valves 2 inches and below shall be ball type and of PVC construction. PVC valves shall be true-union type and the same brand shall be used throughout the water feature project.

2.31 PIPE AND PIPE FITTINGS

A. All pipe and fittings shall be identified by the manufacturer to indicate material, class or type, size and pressure rating.

B. All pipe and fittings should be Sch80 PVC. Where plastic pipe is not used, stainless steel, copper or brass will used.

C. Connections will follow manufacturer's installation instructions for both socket weld and threaded fittings. All PVC connections will be primed with appropriate solvent cleaner applied using the manufacturer's instructions. PVC socket welded pipe and fittings will use solvent cement conforming to ASTM-D2564, listed by NSF International for compliance with ASTM D 2564, NSF/ANSI Standard 14, and NSF/ANSI Standard 61 for use on potable water, drain, waste, vent and sewer applications.

D. No mechanical joint connections will be made underground without approval.

E. Threaded connections will be 125psi minimum. Flanged connections will be 150psi minimum. All fasteners will be stainless steel.

F. Copper tube and fittings will be type-L seamless, conforming to ASTM B88. Solder will be no-lead and water soluble flux will be used for all sweated connections.

G. Copper pro-press fittings may be used for water fill manifold or any copper connection requirement in the equipment space.

2.32 WATERPROOFING

A. Vault and Reservoirs will have an exterior waterproofing, typically supplied by the pre-cast supplier (BASF Sonneborn product or equivalent).

B. Site-applied waterproofing will be a liquid applied. Use Olympic Zeron 100.

2.33 CUSTOM FABRICATED COMPONENTS

A. All custom fabricated components will be made to the highest quality standards. The materials maybe stainless steel, brass, copper, or PVC as defined in the drawings for the project. Custom components must function as intended in the design and questions regarding functionality or construction should be resolved before fabrication begins.

2.34 EQUIPMENT VAULT SUPPORT DEVICES

A. Provide all necessary inserts, fasteners, clamps, rods, channels, straps, bolts, nuts and washers.

B. Supporting devices shall be as manufactured by Unistrut or equal as recommended for the application.

C. Provide all necessary inserts, fasteners, clamps, rods, channels, straps, bolts, nuts and washers.

D. Install pipe on stainless steel or fiberglass strut channel using stainless steel fasteners.

PART 3 – EXECUTION

PLUMBING EXECUTION

3.15 GENERAL

A. Install and connect all equipment, piping, valves, and connections in accordance with manufacturers' instructions and recommendations.

B. Protect all pipes, equipment and other parts of the work against damage by exposure to the weather during construction while stored or installed in place.

C. Make all adjustments required for the proper operation of the plumbing system. Use Manufacturer's representatives or factory technicians where adjustments cannot be accomplished by the Installing Contractor's personnel.

3.16 FILTER SYSTEMS

A. Piping assembly shall be installed as shown on the manufacturer’s drawings and in accordance with the provisions of this Section appropriate to the pump, valves and fittings used.

B. Internal distribution piping and media shall be installed in strict accordance with written instruction from the manufacturer of the filter assembly after the tank has been set in place and all external piping is completed.

3.17 VALVE INSTALLATION

A. Do not install with valve stems below horizontal centerline.

3.18 PIPE INSTALLATION

A. Provide flanges or unions as necessary to allow removal and re-installation of any item of equipment or accessory without forcing, cutting, welding or soldering.

B. Protect all openings in piping during construction to prevent entrance of foreign matter.

C. Cut pipe and tubing ends square. Remove rough edges and burrs so that a smooth and unobstructed flow will be obtained. Remove cutting debris from pipe before assembly.

D. Close or short nipples should be used only where absolutely necessary to satisfy dimensional constraints.

E. Suction piping shall not be installed where air can become trapped, unless a bleed valve can be installed.

F. Unless otherwise noted, connections to equipment or accessories shall be screwed for sizes 2 inches and smaller, flanged for sizes 3 inches and larger.

G. Arrange exposed piping straight, parallel and perpendicular to the walls of the structure unless otherwise shown on the Drawings.

H. Make up threaded joints with Teflon tape and PTFE pipe thread sealant.

I. Remake leaking connections with new materials.

L. No male adapters shall be allowed in this installation.

M. Piping will be solvent welded using Weld-On P-70 primer (clear above & purple below ground) and 717 solvent cement or approved equivalent. Solvent cement will be gray in color, selected for the appropriate size of pipe and temperature range, and applied using the manufacturer's instructions. All excess cement shall be wiped from joint.

N. Discard cement when an appreciable change in viscosity takes place or if cement is lumpy or stringy. Do not thin. Cement must be used before the expiration date shown on the container.

O. Install detection tape along length of each underground pipe. When pipes are stacked install detection tape on top pipe.

3.19 PENETRATIONS

A. Core drilling for pipe penetrations shall be accomplished only at locations and in a manner approved by the structural engineer.

3.20 FLUSHING

B. All water pipe lines shall be flushed free of debris as follows:

- Completely drain all piping and equipment.
- Remove all construction debris and thoroughly sweep water feature surface.
- Fill the system to the required capacity.
- Circulate the water throughout the system for one hour.
- Completely drain reservoir, piping and equipment and remove all debris which may have collected in suction and/or discharge strainers.

3.21 HOUSEKEEPING PADS

A. Pumps shall be erected on concrete housekeeping pads. Fastening of the motor frames to the pad shall be done in such a manner as to allow the motor/impeller unit to be easily removed without disconnecting the pump housing or associated piping.

3.22 PIPING AND EQUIPMENT SUPPORT

A. Provide equipment anchorage, pipe supports and hangers as necessary to maintain alignment, prevent stress and allow removal and maintenance of functional equipment. Piping shall not be supported by the equipment. All equipment anchorage, pipe supports and hangers shall be designed, installed and braced in accordance with UBC requirements to prevent movement.

B. Where several pipes occur at the same elevation, trapeze type hangers may be used.

3.23 EQUIPMENT IDENTIFICATION

A. Provide a securely attached permanently engraved nameplate for each piece of equipment, where appropriate, containing all data required to properly identify the equipment.

B. Provide a valve tag for each valve, as indicated on the P&ID, to provide information to correlate the valve with its function.

C. Install nameplates for gauge/control devices as shown on the Drawings.

D. Attach using stainless steel machine screws or stainless steel stranded safety wire.

3.24 LUBRICATION

A. Before any rotating equipment is put in operation for testing purposes, properly lubricate with lubricants recommended by the manufacturer. Further lubricate before final acceptance. Provide a complete schedule of lubrication of all rotating equipment within the equipment operation and maintenance manual

3.25 PIPING TESTS

A. Provide all temporary piping, pumps, and gauges necessary to conduct the specified tests (reference installation notes on drawings).

B. Conduct all tests before concealment of work and before backfilling.

C. Use water as test medium. Do not test piping with air or any other compressible gas. Vent air from all piping being tested before applying full test pressure.

D. Replace any part that leaks. Repeat test until criteria are met.

E. Do not subject any item to a test pressure greater than the pressure rating of the item at current temperature.

F. Underground piping shall be tested as follows:

1. Pressurize underground discharge piping to 50 psi prior to backfilling (spot backfilling to anchor piping may be done prior to pressurizing).
2. Pressurize all underground drain/suction piping to 20 psi prior to backfilling. (spot backfilling to anchor piping may be done prior to pressurizing).
3. Piping shall remain pressurized until all backfilling and concrete work in the area of the piping is completed.

G. Log pressure readings for all tests required above at the beginning and end of each test and on every working day between. Note the location and cause of any failures and method of repair on the daily log. Be prepared to submit log as part of As-built deliverables.

H. Testing of the completed systems as specified shall be witnessed by the approving authority.

I. The water feature designer shall not be responsible for water quality and water chemistry issues which may result in hard water scaling, high iron content, staining or any other chemical action or reaction to equipment or structures that may occur as a result of local water chemistry issues or improper water chemistry maintenance.

J. The water feature designer shall not be responsible for any incidental or consequential damages, deterioration or any other adverse effects to surrounding soft or hardscape, water feature structure, finishes, piping or any equipment as a result of water quality and chemistry issues and assumes that proper water analysis and appropriate treatment has been implemented prior to obtaining and installing water feature equipment.

K. Owner shall be solely responsible for performing any and all scientific testing deemed necessary to ascertain makeup water feature water quality and chemistry issues prior to constructing the water feature, and for selecting and providing all water treatment equipment and/or chemical additives which may be required to render the water suitable for the water feature application.

L. The water feature is designed to use potable water with the following water chemistry. Free chlorine: 1.0-1.2 ppm; pH: 6.8-7.6; total alkalinity: 70-100 ppm; $CaCO_3$ hardness: 150-200 ppm. The contractor will check the chemistry of the incoming water and notify the Water Feature Engineer if it does not meet the above standard.

3.26 GENERAL

A. Install all materials and equipment in accordance with NEC requirements and the manufacturers' instructions and recommendations.

B. Protect all conduits, conductors and equipment against damage by exposure to weather during construction while stored or installed in place.

C. Coordinate the location of outlets serving equipment furnished by other trades to allow space for necessary access, repair, removal and replacement.

D. Make all adjustments required for proper operation of the electrical system. Use manufacturers' representatives or factory technicians where adjustments cannot be accomplished by the Contractor's personnel.

E. Provide nameplates for all pressure and/or compound gauges, pressure switches, vacuum switches and other sensory or control devices to identify and provide information to correlate the device to operation and maintenance manual.

F. Provide nameplates on exterior of all electrical panels to identify panel and designate maximum voltage within panel.

G. Provide labels for all panel control switches and pilot lights to identify equipment controlled and function.

H. Provide labels in all power distribution panels designating device connected to each circuit breaker.

I. Provide labels on each time clock, control relay, contactor, and motor starter within control panels to identify and provide information to correlate the device to panel electrical drawings.

3.27 CONDUIT AND BOXES

A. Size all conduits in accordance with the NEC to accommodate quantities, sizes and types of conductors shown on the Drawings.

B. Conduit and boxes will be PVC with stainless steel fasteners, unless prohibited by code or otherwise specified in the Specification or Drawings.

C. Minimum conduit size shall be 1 inch unless indicated otherwise on the Drawings.

D. Arrange exposed conduit straight, parallel and perpendicular to the walls of the structure.

E. Group conduits in parallel horizontal or vertical runs wherever practical.

F. Protect all openings in conduit during construction to prevent entrance of foreign matter.

G. Cut conduit ends square. Remove rough edges and burrs.

H. Install all required fasteners, clamps, rods, channels, straps, bolts, nuts and washers to support raceway systems in accordance with the NEC. All material shall be stainless steel or fiberglass.

3.28 GROUNDING AND BONDING

A. Permanently ground and bond transformers, electrical cabinets, motors, conduits, and metal for the support of electrical equipment such as metallic piping systems and reinforcing steel.

B. Furnish all ground rods as required.

C. Grounding and bonding shall be in compliance with Article 250 of the NEC as a minimum.

D. All metallic parts in or around pools shall be grounded and bonded in accordance with Article 680 of the NEC.

END OF SECTION

SECTION 26 5617

PARKING LOT AND SITE LED LIGHTING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Lighting fixtures, including LED lamps arrangements, drivers, wiring, and lighting controls.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 26 0500: Common Work Results for Electrical.
3. Section 26 0513: Basic Electrical Materials and Methods.
4. Section 26 0526: Grounding and Bonding.
5. Section 26 0519: Low-Voltage Wires.
6. Section 26 0533: Raceways, Boxes, Fittings and Supports.
7. Section 26 0923: Lighting Controls Systems.
8. Section 26 2416: Panel boards and Signal Terminal Cabinets.
9. Section 26 5000: Lighting.
10. Section 26 5200: Emergency Power Systems.
11. Section 31 2323: Excavating and Fill for Utilities
12. Section 32 1313: Site Concrete Work.

1.02 REFERENCES

A. Publications are referenced within the text by their basic designation only. The most current version shall apply.

B. American National Standards Institute (ANSI):

1. ANSI C82.SSL1 – SSL Drivers.
2. ANSI C136.2 - American National Standard for Roadway and Area Lighting Equipment – Luminaire Voltage Classification.
3. ANSI C136.3 – American National Standard for Roadway and Area Lighting Equipment – Luminaire Attachments.
4. ANSI C136.10 – American National Standard for Roadway Lighting Equipment – Locking-Type Photocontrol Devices and Mating Receptacle Physical and Electrical Interchangeability and Testing.
5. ANSI C136.15 – American National Standard for Roadway and Area Lighting Equipment – Luminaire Field Identification.
6. ANSI C136.25 – American National Standard for Roadway and Area Lighting Equipment – Ingress Protection (Resistance to Dust, Solid Objects and Moisture) for Luminaire Enclosures.

7. ANSI C136.31 – American National Standard for Roadway Lighting Equipment – Luminaire Vibration.

C. American Society for Testing and Materials International (ASTM):

1. ASTM A36 – Standard Specification for Carbon Structural Steel.

2. ASTM A595 - Standard Specification for Steel Tubes, Low-Carbon or High-Strength Low-Alloy, Tapered for Structural Use.

3. ASTM D1654 – Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

4. ASTM G35 – Standard Practice for Determining the Susceptibility of Stainless Steels and Related Nickel-Chromium-Iron Alloys to Stress-Corrosion Cracking in Polythionic Acids.

D. Federal Trade Commission (FTC):

1. Green Guides, 16 CFR Part 260, Guides for the Use of Environmental Marketing Claims.

E. Illuminating Engineering Society of North America (IESNA):

1. IESNA DG-13 – Guide for the Selection of Photo controls for Outdoor Lighting Applications.

2. IESNA LM-64 – Photometric Measurements of Parking Areas.

3. IESNA LM-79 – IESNA Approved Method for the Electrical and Photometric Measurements of Solid-Sate Lighting Products.

4. IESNA LM-80 – IESNA Approved Method for Measuring Lumen Maintenance of LED Light Sources.

5. IESNA TM-15 – Luminaire Classification System for Outdoor Luminaires

6. IESNA TM-21 – Projecting Long Term Lumen Maintenance of LED Light Sources.

7. IESNA RP-13 – Nomenclature and Definitions for Illuminating Engineering.

F. National Electrical Manufacturers Association (NEMA):

1. ANSI/NEMA/ANSLG C78.377 – American National Standard for the Chromaticity of Solid-State Lighting Products.
2. NEMA WD 7 – NEMA Guide Publication: Occupancy Motion Sensors.

G. Next Generation Lighting Industry Alliance/Department of Energy:

1. LED Luminaire Lifetime: Recommendations for Testing and Reporting – 1st Edition.

H. Underwriters Laboratories (UL):

1. UL – 1449 – Surge Protective Devices.

1.03 DEFINITIONS

A. Lighting terminology used herein as defined in IESNA RP-16. See referenced documents for additional definitions.

B. Exception: The term “driver” is used herein to broadly cover both drivers and power supplies, where applicable.

C. Clarification: The term “LED light source(s)” is used herein in accordance with IES LM-80 to broadly cover LED package(s), module(s), and array(s).

D. Support Assembly: Means a pole or other support structures, brackets, cross-arms, appurtenances, base, anchorage, and foundation.

1.04 SUBMITTALS

A. List of Materials: Submit a complete list of materials proposed for this section.

B. Shop Drawings: Provide detailed and dimensioned Shop Drawings indicating kind, weight and thickness of materials, method of fitting and fastening parts together, location and number of sockets, size of LED boards and drivers, and complete details of method of fitting suspension and fastening fixtures in place. Provide wiring diagrams for lighting control equipment. Drawings shall contain sufficient information to assemble and install equipment at the Project site without further instructions.

Photometric calculations: Submit calculations with graphic of luminance levels of work and floor planes. Calculations shall comply with IESNA LM-64 recommendations.

C. Performance Reports:

1. Luminaire photometric reports per IESNA LM-79 including: laboratory name, report number, date, luminaire catalog number, luminaire and light source specifications. Report shall contain lumen values in Backlight, Uplight, and Glare (BUG) zones per IESNA TM-15 and roadway type classifications luminous intensity, zonal lumen summary, and iso-footcandle diagrams, as well as documentation that specified standards and tests methods were followed.

D. Certifications:

1. LM 79 report at T=0 and T=6000 hours with a summary table showing the percent lumen output change and percent input power change.
2. Provide LM80 test results to demonstrate L70 life after 6000 hours of test.
3. LM-80 test data for the LEDs at the three temperatures per LM-80. Provide extrapolation data using and exponential decay function to show the output at 50,000 hours. Provide the Ts value from the IESNA LM-79 and where the point fall in relation to the IESNA LM-80 extrapolated data. Interpolate between the LM 80 data for the Ts temperature.
4. Provide safety certification and file number as required for the luminaire family that must be listed, labeled or identified per applicable Electrical Code. Applicable testing bodies are determined by the US Occupational Safety Health administration (OSHA), and include ETL, UL, or another Nationally Recognized Testing Laboratory (NRTL).
5. Report substantiating compliance with IESNA TM-21.

E. Certified Statements:

1. Submit manufacturer’s certified statement indicating that the manufacturer has been in the business of fabricating lighting fixtures for outdoor and general area illumination for a minimum of 10 years.

2. Submit manufacturer’s certified statement indicating that the manufacturer has local service with offices no more than 50 miles from Owner’s central offices.

F. Installation Instructions: Submit manufacturer's written installation instructions for fixtures and accessories.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications: 10 years in the fabrication of lighting fixtures.

B. Listing and Labels: Light fixtures shall be Underwriters Laboratory (UL) or Nationally Recognized Testing Laboratory (NRTL) listed, and in compliance with applicable industry standards and codes. NRTL test laboratories shall be qualified by the DOE and listed in the DOE SSL website.

1.06 WARRANTY

A. Five years on-site replacement material, fixture finish and workmanship. On-site replacement includes transportation, removal, and installation of new products. Finish warranty shall include warranty against failure or substantial deterioration such as blistering, cracking, peeling, chalking or fading.

B. Five years material replacement warranty for defective or non-starting LED source assemblies, drivers, and power supply units (PSU).

C. LED source assemblies, drivers and power supplies that fail to maintain illuminance levels per Article 2.03.E shall be provided with an additional 10 years warranty.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Lighting Fixtures.

The approved fixtures shall be Sternberg MS805_LED as indicated on the plan and in these specifications. The MS805_LED lumninaire is a modern replica of a popular styled octagonal fixture available with (A) or without (B) spikes. The version with spikes measures 17-1/2"W x 38"H. The cast aluminum hinged roof is appointed with a spiked finial. The luminaire has LED light sources with roof mounted, down lighting optics. The Luminaire shall be UL listed in US and Canada.

B. Fitter - Standard
The fitter shall be heavy wall cast aluminum. It shall have an inside diameter opening to attach to 3" pole. When ordered with a Sternberg pole, the fitter shall be attached by set-screw to the pole top.

C. LED's
The luminaire shall use high output, high brightness LED's. They shall be mounted in arrays, on printed circuit boards designed to maximize heat transfer to the heat sink surface. The arrays shall be roof mounted to minimize up-light. The LED's and printed circuit boards shall be 100% recyclable, they shall also be protected from moisture and corrosion by a conformal coating of 1 to 3 mils. They shall not contain lead, mercury or any other hazardous substances and shall be RoHS compliant. The LED life rating data shall be determined in accordance with IESNA LM-80. They shall operate in a -40°C (-40°F) to +50°C (122°F) ambient air temperature range. The High Performance white LED's will have a life expectancy of approximately 100,000 hours with not less than 70% of original brightness (lumen maintenance), rated at 25°C. The High Brightness, High Output LED's shall be 4500K (3500K or 2700K option) color temperature with a minimum of 70 CRI

D. Optics

The luminaire shall be provided with individual, refractor type optics applied to each LED. The luminaire shall provide Type _2__ (2, 3, 3R, 4 or 5) light distribution per the IESNA classifications. Testing shall be done in accordance with IESNA LM-79

E. Electronic Drivers The LED driver shall be U.L. Recognized. It shall be securely mounted inside the fixture, for optimized performance and longevity. It shall be supplied with a quick-disconnect electrical connector on the power supply, providing easy power connections and fixture installation. It shall have overload as well as short circuit protection, and have a DC voltage output, constant current design, 50/60HZ. It shall be supplied with line-ground, lineneutral and neutral-ground electrical surge protection in accordance with IEEE/ANSI C62.41.2 guidelines. It shall be dimmable using a 0-10v signal.

F. For sources over 50w: The driver shall have a minimum efficiency of 90%. The driver shall be rated at full load with THD<20% and a power factor of greater than 0.90. The driver shall contain over-heat protection which reduces output to less than half rating if the case temperature reaches 85°C.

G. For sources under 50w: The driver shall have a minimum efficiency of 88%.

H. Photocontrols
Button Style: On a single assembly the photocontrol shall be mounted on the fixture and pre-wired to driver. On multiple head assembly's the photocontrol shall be mounted in the pole shaft on an access plate. The electronic button type photocontrol is instant on with a 5-10 second turn off, and shall turn on at 1.5 footcandles with a turn-off at 2-3 footcandles. Photocontrol is 120-277 volt and warranted for 6 years.

I. Twist-Lock Style: The photocontrol shall be mounted externally on the fixture and prewired to driver. The twist lock type photocontrol is instant on with a 3-6 second turn off, and shall turn on at 1.5 footcandles with a turn-off at 2-3 footcandles. Photocontrol is 120-277 volt and warranted for 6 years.

J. Warranty Seven-year limited warranty. See product and finish warranty guide for details.

K. Finish Refer to website for details.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Drivers and LED boards shall be permanently labeled with the day of installation with one inch high letters produced with a P-touch or similar permanent labeling system.

B. Standards shall be installed plumb and straight on concrete footings. Concrete requirements and procedures are as specified in Section 32 1313.

C. Emergency light fixtures shall be labeled "Emergency Fixture" with one inch high letters produced with a P-touch or similar permanent labeling system.

3.02 TESTING

A. Check and adjust fixtures for required illumination.

B. Replace defective drivers and LED boards.

C. Test and adjust lighting control equipment for proper operation.

3.03 SPARE PARTS

A. Furnish ten percent spare drivers with a minimum of one spare LED board of each type.

B. Furnish five percent spare motion detectors of each type with a minimum of one spare detector of each type.

3.04 HAZARDOUS WASTE DISPOSAL

A. Hazardous waste disposals shall be handled and disposed of by licensed contractor.

B. Store, remove, transport and dispose of hazardous materials in all accordance with state and federal regulations.

C. Provide Owner with copy of manifest and certificate of destruction.

3.05 PROTECTION

A. Protect the Work of this section until Substantial Completion.

3.06 CLEANUP

A. Remove rubbish, debris, and waste materials from all areas of work each day.

B. Clean fixture surfaces of dirt, cement, plaster and debris. Furnish cleansers compatible with material surfaces being cleaned.

END OF SECTION

SECTION 31 10 00
SITE CLEARING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
1. Removal of vegetation, grass, grass roots, shrubs, tree stumps, trees, upturned stumps, weed growth, tree roots, brush, masonry, concrete, rubbish, debris and other materials.
2. Removal of concrete and bituminous surfaces.
3. Removal of existing fences and gates.

B. Related Requirements:
1. Division 01 - General Requirements.
2. Section 31 2200 - Grading.
3. Section 31 2313 - Excavation and Fill.
4. Section 31 2316 - Excavation and Fill for Pavement.
5. Section 31 2319 - Excavation and Fill for Structures.
6. Section 31 2323 - Excavation and Fill for Utilities.
7. Section 31 2326 - Base Course.
8. Section 32 3113 - Chain Link Fences and Gates.
9. Section 32 9000 - Planting.

1.02 SUBMITTALS

A. Shop Drawings: Submit site plan indicating extent of site clearing.

1.03 QUALITY ASSURANCE

A. Comply with Standard Specifications for Public Works Construction, current edition, as a minimum requirement.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 TREE AND STUMP REMOVAL

A. Remove trees and stumps indicated or required to be removed. Remove trees, together with bulk of roots, to a minimum depth of 4 feet below required grade, and within a radius of approximately 7 feet beyond perimeter of trunk at grade.
B. Fill and compact excavation from tree and stump removal. Fill in 6 inch layers, each compacted to 90 percent of maximum density in accordance with ASTM D1557.
1. Back filling shall not commence until the excavation is inspected and tested.

3.02 CONCRETE AND BITUMINOUS SURFACING REMOVAL

A. Break up and completely remove existing concrete surfacing, curbs, gutters, walks and bituminous surfacing to indicated limits. Cutting shall be performed to a neat and even line with proper tools or a concrete cutting saw. Minimum depth of cut shall be 1 1/2-inch, unless otherwise indicated. Remove concrete broken beyond the indicated limits to the nearest joint or score line and replace with new concrete to match existing.

3.03 FENCING

A. Where existing project site are placed that are intended as site protection, the removal of those fences, when necessary for construction, shall be carefully coordinated with adjacent Contractors and the Owner.

B. Fencing indicated to be removed and not reinstalled shall be completely removed, including footings. Fill and compact excavations.

3.04 CLEANUP

A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 31 22 00
GRADING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
1. General exterior grading, cutting and filling, including grading for building area, paving, planting areas, banks and hillsides.

B. Related Requirements:
1. Division 01 - General Requirements.
2. Section 31 1000 - Site Clearing.
3. Section 31 2313 - Excavation and Fill.
4. Section 31 2316 - Excavation and Fill for Pavement.
5. Section 31 2319 - Excavation and Fill for Structures.
6. Section 31 2323 - Excavation and Fill for Utilities.
7. Section 31 2326 - Base Course.
8. Section 32 9000 - Planting.

1.02 PROJECT REQUIREMENTS

A. General:
1. Fees: Pay as required by authorities having jurisdiction over the area.
2. Bonds: Post as required by authorities having jurisdiction over the area.
3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.
4. Before grading, contact DIG TESS and all other applicable campus, local, and state authorities for information on public buried utilities and pipelines. Retain the services of an underground utility locator for on-site utilities.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials shall conform to requirements specified in this and related sections.

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect and maintain installed stakes until their removal is required for the Work. Provide replacement grade or location stakes lost or disturbed.

B. Install grade stakes and compare to indicated grades. If discrepancies are found between existing grades and grades indicated on Drawings, do not proceed until discrepancies are resolved.

3.02 ROUGH AND FINE GRADING

A. Rough grade area sufficiently high to require cutting by fine grading:

1. Grade area for bituminous surfacing and other paving to the indicated grades, equal to the section of the indicated base and pavement.
2. Slope banks to required finish grades as cut progresses or leave cuts full and finish grade by mechanical equipment to provide grades and soil densities indicated on the Drawings.
3. Rough grade, fill and compact banks beyond indicated finish grades. Finish grade banks and slopes to indicated grades and specified soil densities.
4. Grade Only Areas: In areas not indicated to receive pavement, rough grade to approximate finish grades and then scarify, moisten and roll to obtain required density and indicated finish grades.
5. Tolerances: Finish grades shall be within a tolerance of 0.05 inch per foot above or below grades indicated. Provide an average grade as indicated.

B. Base or Subgrade:

1. After subgrade has been constructed to approximate required grades, scarify to a depth of at least 6 inches:

a. After scarifying, process loosened material to a finely divided condition and adjust moisture content to optimum condition by addition of water, addition and blending of dry suitable material, or by drying of existing material.

b. In areas where there <u>will not</u> be turf, trees, or planting beds, the subgrade material shall be compacted by tamping, sheepsfoot rollers or pneumatic tire rollers. Required relative compaction shall be [90] percent standard proctor minimum for the top 6 inches below subgrade.

c. In areas where there <u>will be</u> turf, trees, or planting beds, the subgrade material shall be placed and allowed to settle so as to meet the finished grades shown on the drawings. Contractor may wet subgrade material in order to hasten the settlement of the soils. Under no case shall heavily compacted soils be placed within areas where there will turf, trees, or planting beds.

c. Install base course in accordance with Section 31 2326 - Base Course.

2. Tolerance of completed grades of base or subgrade shall not vary more than 0.03 inch per foot from grades indicated. Provide an average grade as indicated.

3.03 SHORING

A. Provide shoring as necessary to properly and safely support earth sides of excavations, and existing curbs, sidewalks, gutter, drives and stairs, against movement and collapse.

B. Design and Calculations: Provide in accordance with requirement of OSHA.

C. Remove shoring upon completion of the Work of this section or when no longer needed unless required otherwise by authorities having jurisdiction.

3.04 EXCESS MATERIAL DISPOSAL

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.05 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 31 23 16
EXCAVATION AND FILL FOR PAVING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
1. Excavating, backfill, and compacting for paved areas.
2. Installation of fill materials.

B. Related Requirements:
1. Division 01 - General Requirements.
2. Section 01 4524 - Environmental Import/Export Material Testing.
3. Section 31 1000 - Site Clearing.
4. Section 31 2200 - Grading.
5. Section 31 2323 - Excavation and Fill for Utilities.
6. Section 32 2326 - Base Course.
7. Section 32 0117 - Pavement Repair.
8. Section 32 1216 - Asphalt Paving.
9. Section 32 1313 - Site Concrete Work.

1.02 PROJECT REQUIREMENTS

A. Import and Export of Earth Materials:
1. Fees: Pay as required by authorities having jurisdiction over the area.
2. Bonds: Post as required by authorities having jurisdiction over the area.
3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.

1.03 SUBMITTALS

A. Imported Soils: A geotechnical engineer, retained by the Owner as an Owner Consultant, shall obtain initial product Sample for testing in accordance with the terms of Article 3.05 of this section.

1.04 QUALITY ASSURANCE

A. Comply with Standard Specifications for Public Works Construction, current edition, except as modified herein.
B. Sampling, testing, and certification of imported and/or exported soils shall be performed in accordance with Section 01 4524 - Environmental Import/Export Material Testing.

1.05 PROJECT CONDITIONS

A. Information on Drawings or in soils report does not constitute a guarantee of accuracy or uniformity of soil conditions over the Project site.

B. A copy of the foundation investigation and soils report is available for examination at the Architect's office during regular office hours of Architect.

PART 2 - PRODUCTS

2.01 BASE MATERIALS

A. Concrete Slabs On Grade: Provide "Crushed Aggregate Base "as specified in the Standard Specifications for Public Works Construction, Section 200: "Rock Materials," with ¾ inch maximum size aggregates. Provide 3-inch thick base, unless noted otherwise.
B. Bituminous Surfacing: As indicated on Drawings and specified in Section 31 2326 - Base Course.

2.02 FILL AND BACKFILL MATERIALS

A. Fill and backfill materials shall be previously excavated materials or imported fill material, free of clods and stones larger than 3-inch, foreign materials, vegetable growths, sod, expansive soils, rubbish and debris. Material shall conform to these specified requirements and related sections.
B. Fill material exhibiting a wide variation in consistency and moisture content shall be blended or aerated to stabilize and upgrade the material.
C. Imported Fill Material:
1. Provide suitable materials obtained from Project site excavations for earthwork and fill materials. If excavated materials are not of suitable quality or sufficient quantity, import additional materials as necessary.
2. Imported fill shall be a granular material with sufficient binder to form a firm and stable unyielding subgrade and shall not have more than 60 percent of fines passing 200 mesh sieve. Material shall have a coefficient of expansion of not more than 2 percent from air dry to optimum moisture content and not more than 6 percent from air dry to saturation. Imported material shall be clean and free of rubbish, debris, and toxic or hazardous contaminants. Adobe or clay soils are not permitted.
D. Other Fill Materials: Brick rubble and broken concrete originating from the Project site may be legally disposed of off the Project site or incorporated in fill, if reviewed by a geotechnical engineer, retained by the Owner as an Owner Consultant. Unless otherwise required, no such materials may be imported from outside the Project site.
E. Permeable Backfill:
1. Provide permeable backfill material behind retaining structures consisting of gravel, crushed gravel, crushed rock, natural sands, manufactured sand, or combinations of these materials conforming to the following gradations:

Sieve Size:	Percentage Passing:
3/4 inch (19mm)	100
3/8 inch (10mm)	80 to 100
No. 100	0 to 8
No. 200	0 to 3

2. Those portions of fill material passing a No. 4 sieve shall provide a sand equivalent of at least 60.

3. Provided backing for weep holes shall consist of two cubic feet of aggregate in burlap sacks, securely tied. Aggregate shall conform to requirements for No. 3 concrete aggregate as specified in subsection 200-1.4 of the Standard Specifications for Public Works Construction.
4. Permeable Backfill Alternate Materials: Instead of the materials specified for retaining structures backfill, a drainage matting system, Miradrain by Mirafi, Inc., or equal, may be provided if reviewed by the Architect.

PART 3 - EXECUTION

3.01 SITE PREPARATION

A. Clear the Project site as required in Section 31 1000 - Site Clearing.

3.02 PROTECTION

A. Protect and guard excavations against danger to life, limb, and property as required by, but not limited to, Cal-OSHA regulations.
B. Protect adjacent existing improvements including landscaping against damage.

3.03 EXISTING UTILITY LINES

A. Protect existing utility lines from damage or displacement.
B. Remove conduits or pipes not in service, exposed during Work, unless a minimum cover of 2 feet is provided. Remove concrete, clay or other non-metallic pipe over 8 inches in diameter, unless otherwise indicated.

3.04 EXCAVATION

A. Unclassified Excavations: Comply with the Standard Specifications for Public Works Construction, Section 300: "Earthwork," except as modified herein.

3.05 FILL

A. Unclassified Fill and Compaction: Comply with the Standard Specifications for Public Works Construction, Section 300: "Earthwork," except as modified herein.
B. Provide fill materials as specified in Part 2 - Products. If excavated materials from the Project site are not of required quality or sufficient quantity, import additional materials as necessary.
C. In addition to the requirements of this section, import and/or exported materials shall comply with the requirements of Section 01 4524 - Environmental Import/Export Material Testing. Imported fill materials shall be sampled by a geotechnical engineer, retained by the Owner as an Owner Consultant, for compliance with the requirements of Part 2 of this Section. The geotechnical engineer, retained by the Owner as an Owner Consultant, shall submit samples to a DSA approved independent approved testing laboratory for testing .Initial sampling shall be performed by the geotechnical engineer, retained by the Owner as an Owner Consultant, before importing material to the Project site. Identify the location of the source site in addition to the address, name of the

person and/or entity responsible for the source site. The geotechnical engineer, retained by the Owner as an Owner Consultant, shall obtain both the initial and additional samples from the identified site and shall submit samples to the approved independent testing laboratory for testing.
The geotechnical engineer, retained by the Owner as an Owner Consultant, shall perform additional sampling during import operations. If the total quantity of import is determined to be greater than 1,000 cubic yards of material, one sample shall be obtained and submitted for testing tested for each 250 cubic yards of imported material. If the total quantity of import is determined to be less than 1,000 yards, one sample shall be obtained and submitted for testing for each 100 cubic yards of imported material.
The independent approved testing laboratory shall perform the required tests and report results of tests noting if the tested material passed or failed such tests and shall furnish copies to the Project Inspector, Architect, OAR, Contractor, and others as required. Report shall state tests were conducted under the responsible charge of a licensed State of Texas professional engineer and the material was tested in accordance with applicable provisions of the Contract Documents, CBC, and the DSA. Upon completion of the Work of this section, the independent testing laboratory and geotechnical engineer shall submit a verified report to the DSA as required by CBC.
Bills of lading or equivalent documentation will be submitted to the Project Inspector on a daily basis. Upon completion of import operations, provide the OAR a certification statement attesting that imported material has been obtained from the identified source site.

3.06 INSTALLATION OF MATERIALS

A. Fill or backfill materials shall be installed in horizontal layers of 6 inches, unless otherwise required. Each layer shall be evenly placed and moistened or aerated as necessary. Unless otherwise reviewed by the geotechnical engineer, retained by the Owner as an Owner Consultant, each layer of fill material shall cover the length and width of the area to be filled before the next layer of material is installed. Top surface of each layer shall be installed to an approximate level with a crown or crossfall of at least 1 in 50, but no more than 1 in 20. Provide adequate drainage at all times during construction of the Work of this section.

3.07 COMPACTING

A. Each layer of fill material shall be compacted by tamping, sheepsfoot rollers, or pneumatic-tired rollers to provide specified relative compaction. At inaccessible locations, provide specified compaction by manually held, operated and directed compaction equipment.
B. Unless otherwise indicated, compact each layer of earth fill to a relative compaction of at least 90 percent.
C. When fill materials, or a combination of fill materials, are encountered or provided which develop densely packed surfaces as a result of installation or compacting operations, scarify each compacted layer before installing the next succeeding layer.

3.08 INSPECTION AND TESTING

A. The geotechnical engineer, retained by the Owner as an Owner Consultant, will inspect and test excavations, sample material quality as required in Part 2, and observe installation and compaction of fill materials.

B. The geotechnical engineer, retained by the Owner as an Owner Consultant, will sample imported fill materials from their designated source before delivery to the Project site.

C. Installation of backfill shall be observed by the geotechnical engineer, retained by the Owner as an Owner Consultant.

D. The geotechnical engineer, retained by the Owner as an Owner Consultant, will inspect and test excavation Work before the installation of fill and/or other materials.

E. Compaction: Test compaction in accordance with ASTM D1557, Method C.

3.09 PROTECTION

A. Protect the Work of this section until Substantial Completion.

3.10 CLEANING

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 32 14 15 INTERLOCKING CONCRETE PAVERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete paver units.

B. Bedding and joint sand.

1.2 RELATED SECTIONS

A. Section 32 91 00 – Planting

B. Section 32 84 00 – Planting Irrigation

1.3 REFERENCES

A. American Society of Testing and Materials (ASTM):
1. C 33, Specification for Concrete Aggregates.
2. C 136, Method for Sieve Analysis for Fine and Coarse Aggregate.
3. C 140, Sampling and Testing Concrete Masonry Units.
4. C 144, Standard Specification for Aggregate for Masonry Mortar.
5. C 936, Specification for Solid Interlocking Concrete Paving Units.
6. C 979, Specification for Pigments for Integrally Colored Concrete.
7. D 698, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 5.5-lb (2.49 kg) Rammer and 12 in. (305 mm) drop.
8. D 1557, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 10-lb (4.54 kg) Rammer and 18 in. (457 mm) drop.
9. D 2940, Graded Aggregate Material for Bases or Subbases for Highways or Airports.

1.4 SUBMITTALS

A. Submit product drawings and data.

B. Submit full size sample sets of concrete paving units to indicate color and shape selections. Color will be selected by Architect/Engineer/Landscape Architect/Owner from manufacturer's available colors.

C. Submit sieve analysis for grading of bedding and joint sand.

D. Submit test results from an independent testing laboratory for compliance of paving unit requirements to ASTM C 936.

E. Indicate layout, pattern, and relationship of paving joints to fixtures and project formed details.

F. Substitutions: Substitutions shall be submitted 10 days prior to bid opening for acceptance.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver concrete pavers to the site in steel banded, plastic banded, or plastic wrapped cubes capable of transfer by fork lift or clamp lift. Unload pavers at job site in such a manner that no damage occurs to the product.

B. Sand shall be covered with waterproof covering to prevent exposure to rainfall or removal by wind. The covering shall be secured in place.

C. Coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving.

1.6 ENVIRONMENTAL CONDITIONS

A. Do not install sand or pavers during heavy rain or snowfall.

B. Do not install sand and pavers over frozen base materials.

C. Do not install frozen sand.

PART 2 - PRODUCTS

2.1 CONCRETE PAVERS

A. Concrete pavers shall be supplied by BELGARD, or approved manufacturer.
Contact: Jewell Concrete, (254) 772-3440 in Waco, Texas

B. Product used shall be as shown on the drawings. Provide color submittals for approval prior to ordering, as site may require specific color blending.

C. Pavers shall meet the following requirements set forth in ASTM C 936, Standard Specification for Interlocking Concrete Paving Units:

1. Average compressive strength of 8,000 psi (55 MPa) with no individual unit under 7,200 psi (50 Mpa).

2. Average absorption of 5% with no unit greater than 7% when tested in accordance with ASTM C 140.

3. Resistance to 50 freeze-thaw cycles when tested in accordance with ASTM C 67.

4. Pigment in concrete pavers shall conform to ASTM C 979.

5. Material shall be manufactured in individual layers on production pallets.

6. Materials shall be manufactured to produce a solid homogeneous matrix in the produced unit.

2.2 VISUAL INSPECTION

A. All units shall be sound and free of defects that would interfere with the proper placing of unit or impair the strength or permanence of the construction.

B. Minor cracks incidental to the usual methods of manufacture, or chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection.

2.3 SAMPLING AND TESTING

A. Manufacturer shall provide access to lots ready for delivery to the Owner or his authorized representative for testing in accordance with ASTM 936-82 for sampling of material prior to commencement of paver placement.

B. Manufacturer shall provide a minimum of three (3) years testing backup data showing manufactured products that meet and exceed ASTM 936-82 when tested in compliance with ASTM C-140.

C. Sampling shall be random with a minimum of nine (9) specimens per 20,000 sq. ft. per product shape and size with repeated samples taken every additional 20,000 sq. ft. or a fraction thereof.

D. Test units in accordance with ASTM for compressive strength, absorption and dimensional tolerance. A minimum of three (3) specimens per test required for an average value. Testing of full units is preferred.

2.4 REJECTION

A. In the event the shipment fails to conform to the specified requirements, the manufacturer may sort it, and new test units shall be selected at random by the LANDSCAPE ARCHITECT from the retained lot and tested at the expense of the manufacturer. If the second set of test units fails to conform to the specified requirements, the entire lot shall be rejected.

2.5 EXPENSE OF TESTS

A. The expense of inspection and testing shall be borne by the GENERAL CONTRACTOR.

2.6 BEDDING AND JOINT SAND

A. Bedding and joint sand shall be clean, non-plastic, free from deleterious or foreign matter. The sand shall be natural or manufactured from crushed rock. Limestone screenings or stone dust shall not be used. When concrete pavers are subject to vehicular traffic, the sands shall be as hard as practically available.

B. Grading of sand samples for the bedding course and joints shall be done according to ASTM C 136. The bedding sand shall conform to the grading requirements of ASTM C 33 as shown in Table 1.

Table 1
Grading Requirements for Bedding Sand

ASTM C 33	
Sieve Size	Percent Passing
3/8 in. (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (600 µm)	25 to 60
No. 50 (300 µm)	10 to 30

No. 100 (150 µm) 2 to 10

C. The base material shall be a road-base type caliche mix, evenly laid with a 95% min. Proctor density rating. Base material shall be free of stones larger than 1.5” diameter, trash, or debris.

D. All sand used for sweeping into joints after paver installation shall be Polymeric Sand specifically manufactured and packaged for the paving industry.

PART 3 EXECUTION

3.1 EXAMINATION

During and after installation, the Landscape Architect and/or Architect will:

A. Verify that subgrade preparation, compacted density and elevations conform to the specifications. Compaction of the soil subgrade to at least 95% Standard Proctor Density per ASTM D 698. Stabilization of the subgrade and/or base material may be necessary with weak or saturated subgrade soils. The Landscape Architect/Architect will inspect subgrade preparation, elevations, and conduct density tests for conformance to specifications.

B. Verify that geotextiles, if applicable, have been placed according to specifications.

C. Verify that aggregate base materials, thickness, compaction, surface tolerances, and elevations conform to the specifications.

D. Verify location, type, installation and elevations of edge restraints around the perimeter area to be paved.

E. Verify that base is dry, uniform, even, and ready to support sand, pavers, and imposed loads.

F. Beginning of bedding sand and paver installation means acceptance of base and edge restraints.

3.2 INSTALLATION

A. Spread the sand evenly over the base course and screed to a nominal 1 in. (25 mm) thickness, not exceeding 11/2 in. (40 mm) thickness. The screeded sand should not be disturbed. Place sufficient sand to stay ahead of the laid pavers. Do not use the bedding sand to fill depressions in the base surface.

B. Ensure that pavers are free of foreign materials before installation.

C. Lay the pavers in the pattern(s) as shown on the drawings. Maintain straight pattern lines.

D. Joints between the pavers on average shall be between 1/16 in. and 3/16 in. (2 mm to 5 mm) wide.

E. Fill gaps at the edges of the paved area with cut pavers or edge units.

F. Cut pavers to be placed along the edge with a masonry saw. No mechanical cuts or breaks can be used for edge treatments.

G. Use a low amplitude, high frequency plate vibrator to vibrate the pavers into the sand. Use Table 3 below to select size of compaction equipment:

Table 3

Paver Thickness	Minimum Centrifugal Compaction Force
60 mm	3000 lbs. (13 kN)
80 mm	5000 lbs. (22 kN)

H. Vibrate the pavers, sweeping dry joint sand into the joints and vibrating until they are full. This will require at least two or three passes with the vibrator. Do not vibrate within 3 ft. (1 m) of the unrestrained edges of the paving units.

I. All work to within 3 ft. (1 m) of the laying face must be left fully compacted with sand-filled joints at the completion of each day.

J. Sweep off excess sand when the job is complete.

K. The final surface elevations shall not deviate more than 3/8 in. (10 mm) under a 10 ft. (3 m) long straightedge.

L. The surface elevation of pavers shall be 1/8 in. to 1/4 in. (3 to 6 mm) above adjacent drainage inlets, concrete collars or channels.

M. The resanding as necessary of paver joints shall be accomplished by contractor for a period of 90 days after completion of work.

3.3 FIELD QUALITY CONTROL

A. After removal of excess sand, final elevations will be checked for conformance to the drawings.

END OF SECTION 32 14 15

SECTION 32 84 00
LANDSCAPE IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 SUBMITTALS

A. A complete listing of all manufacturers, products, model numbers, and designs proposed for use in this scope of work shall be required.

A. Maintain two (2) current copies of all shop drawings showing locations of underground piping, wires, sleeves, valves, ect. for easy and quick reference by anyone inspecting the project site. Copies should show location as well as the exact sizing of irrigation lines, valves, and wiring components.

1.2 RELATED DOCUMENTS AND QUALITY ASSURANCE

A. All work done in accordance with all applicable ordinances of the State of Texas, the City of Wichita Falls, and Midwestern State University.

B. Any and all permits, licenses, etc., or other requirements shall be supplied by the Texas licensed Landscape Irrigator. Applicable provisions of conditions of the contract and special conditions govern this work.

C. It is the intent of the drawings and specifications that the sprinkler system works as set out herein shall constitute a totally complete system serving all areas as set on the drawings. In the event of any omission, or if cause for doubt should arise in connection with the description, the inclusion or exclusion of any required item or items, bidders shall request clarification from the Owner and obtain same to establish total understanding of all requirements. The submission of bid will be construed as evidence that the Contractor understands clearly and fully all requirements of the work.

1.3 DESCRIPTION OF WORK

The drawings on which these specifications are based are generally diagrammatic and indicative of the irrigation system to be installed. Due to the scale of drawing, it is not possible to indicate all offsets, fittings, and sleeves, which may be required to meet site conditions. The Contractor shall not willfully install the irrigation system as shown on the drawings when it is obvious in the field that obstructions, additions, or differences would cause the designed system to be ineffective. Differences should be brought to the Owner, who will make any necessary changes. This work shall be considered incidental to the project. In the event that this notification is not performed, the Contractor shall assume full responsibility for any revisions necessary.

The furnishing and installing of the sprinkler components as shown on the plans, ready for operation, shall include but not be limited to the following:

A. All piping, trenching sleeves, remote electric valves, controllers, anti-siphon devices, etc., installed as shown on the plans and required to provide distribution of water to all sprinkler heads indicated and/or specified.

B. All sprinkler heads installed as specified and as shown on the plans as required to provide adequate controlled water to all areas.

C. All booster pumps and accompanied skids, plumbing, wiring, ect. necessary to provide the pumping and hydraulic requirements necessary as specified on the drawings and in these specifications.

D. All electrical material, telephone or cable connections and labor required to connect primary electrical service and control modules.

1.4 WORK BY OTHERS

A. The Contractor will be responsible for providing a licensed electrician to connect any controller to the site's power source.

1.5 DEFINITIONS

A. "Sprinkler Mains" are the portion of piping from water source to operation valves.

B. "Lateral Piping" is that portion of the piping from the operating valves to the sprinkler heads.

C. "Re-use Lines" refer to existing or proposed piping that carries treated, non-potable water.

1.6 SUBSTITUTIONS

Material shall be as specified. The Owner has standardized the campus to Hunter Irrigation Products. To ensure compatibility, all components must be Hunter products. Substitutions must have the approval of the Owner in writing prior to bid opening and installation.

1.7 SHOP DRAWINGS AND SAMPLES

The Contractor is to provide shop drawings and samples as necessary to identify materials and layout of said materials. By submitting shop drawings and samples, the Contractor thereby represents that it has determined and verified all field measurements, field construction criteria, materials and similar data, or will do so; that it has checked and coordinated each Shop Drawing and Sample with requirements of the work and of the Contract Documents.

1.8 AS-BUILT AND ENGINEERED DRAWINGS

The Contractor is to provide “As-Built” Drawings on reproducible plans furnished as provided by the Owner. Information to be included will be: “As installed” dimensional locations from permanent fixed points, such as building walls or corners, sidewalks, curbs, etc. Drawings should show actual measurements from fixed points to locations of system components, such as electric valves, quick couplers, mainlines, heads, and control boxes. Dimensions are to be recorded on the drawings so that maintenance personnel can locate and service these items. Engineered

shop drawings shall be provided by the Contractor for the pump station configuration. These drawings may be prepared by the manufacturer of the pumping equipment as noted under Section 2.7 of these specifications.

PART 2 - MATERIAL SPECIFICATIONS

2.1 POLYVINYL CHLORIDE PIPE

Polyvinyl chloride pipe (PVC) shall have been manufactured in accordance with the standards as follows:

A. All mainlines 3” or larger shall be Gasketed Schedule 40 pipe, all mainlines below 3” shall be solvent welded Schedule 40 pipe, and all laterals shall be minimum SDR-21 (Class 200) specification.

2.2 PIPE FITTINGS

A. All PVC fittings shall be Schedule 40 solvent weld type, which are compatible to PVC pipe. All fittings shall conform to ASTM #D24464 and D264 for plastic pipe fittings.

B. When taps involve transit lines located on campus, Schedule 80 fittings should be used.

C. Schedule 80 fittings should be used on all 4” x 4” x 2” tees. All fittings of the following configurations shall be ductile iron push-on fittings: 90’s, 45’s, 22’s, and 4” x 4” x 4” tees.

D. All solvent shall conform to ASTM #D2564 solvent cement for PVC pipe and fittings.

2.3 VALVE INSTALLATION

Electric remote valves shall be supplied in accordance with the size and specifications shown in the plan. All valves are to be 100 series Irritrol Century valves with purple NP solenoids and omni regs installed. Remote control valves shall be solenoid-operated, diaphragm, global type with 150 psi CWP rating, having IPS threads and suitable for underground burial without protection.

A. Valves shall be installed in level position. Valves shall be installed deep enough so that there will be a minimum of 12" of cover over the valve.

B. DBY wire connectors shall be used on all valves.

C. Manufacturer's specifications and installation instructions for the valve supplied shall become a part of these specifications.

D. A heavy-duty design valve box will be installed over each valve. The box shall be of heavy gauge plastic construction and have a lockable type lid. All valve boxes are to be jumbo with purple non-potable lids. The box will be installed so that the top is level with grade.

2.4 AUTOMATIC CONTROLLERS

The system shall be controlled by a wall mounted self-contained electrical irrigation controller. Required controller shall be a Hunter controller equivalent to an ESP-SAT RainBird 40-station controller (ICC2 with metal cabinet) with a minimum of 110% of the stations needed on the plans and must match all other clocks on campus for future automated controls. All controllers need to be able to communicate with the University's Central Control Station, and the necessary cable or phone lines required for this capability shall be included in this project scope.

2.5 TECHLINE DRIP IRRIGATION

Techline shall consist of nominal sized one-half inch (½") low-density linear polyethylene tubing with internal pressure compensating, continuously self-cleaning, integral drippers at a specified spacing, (12", 18", or 24" centers) or blank tubing without drippers. The tubing shall be brown in color and conform to an outside diameter (O.D.) of 0.66 inches and an inside diameter (I.D.) of 0.56 inches. Individual pressure compensating drippers shall be welded to the inside wall of the tubing as an integral part of the tubing assembly. These drippers shall be constructed of plastic with a hard plastic diaphragm retainer and a continuously self-flushing elastomer diaphragm capable of flushing any dirt or debris that may enter the dripper, extending the full length of the dripper. The dripper shall have a built-in physical root barrier whereby the water shall exit the dripper from a point different than where it shall exit the tubing. This physical barrier shall create an air gap inside the tubing.

A. Each dripper shall have the ability to independently regulate discharge rates, with an inlet pressure between seven to seventy (7 - 70) pounds per square inch (psi), at a constant rate of flow and with a manufacturer's coefficient of variability (Cv) of 0.03 or less. Recommended operating pressure shall be between 15 - 50 psi. The dripper discharge rate shall be 0.4, 0.6, or 0.9 gallons per hour (GPH) utilizing a combination turbulent flow/reduced pressure compensation cell mechanism and a diaphragm to maintain uniform discharge rates. The drippers shall be capable of continuously cleaning themselves while in operation. The dripper line shall be available with 12", 18", and 24" spacing between drippers unless otherwise specified. For subsurface installation, Techline pipe shall be placed on the finished soil grade prior to decomposed granite installation. Maximum system pressure shall be 50 psi. Filtration shall be 120 mesh or finer. Bending radius shall be 7". For on-surface or under mulch installations, 6" metal wire staples (TLS6) shall be installed 3'-5' on center, (depending on soil type) and two staples shall be installed over every change-of-direction fitting. Techline shall be a Netafim Model Number as specified on the sealed drawings.

PART 3 - INSTALLATION SPECIFICATIONS

3.1 INSTALLATION, GENERAL

A. Before installation is started, the Contractor shall place a stake where each sprinkler head is to be located in accordance to the drawings. The staking shall be approved in writing by the Owner before installation is started. Should a discrepancy in the plans become apparent at this time, in regard to the location of the areas to be watered, such discrepancy shall be pointed out to the Owner. Work must not proceed until the Owner approves or alters the discrepancy. Should such

changes create extra cost to the Contractor, approval for agreed upon extra compensation must be obtained in writing from the Owner before commencing work.

B. The Contractor is cautioned to provide adequate protection to all individuals that may be using the site. Provide barricades as necessary over holes and trenches and install "Caution" signs in traffic ways.

C. Holes and trenches cannot be left open for more than 24 hours without written permission from the Owner. All holes must be barricaded at all times when open. Trenching shall be done in a manner so as to avoid going under the “drip” or “canopy” line of existing trees on site.

D. All horizontal obstructions, such as street, sidewalks, permanent trails, curbs, etc. will be bored under rather than cut. Location and protection of all above and below-grade utilities shall be solely the Contractor’s responsibility and liability.

E. After head installation, the Contractor shall take all necessary action to adjust the throw radius and direction of each head so as to prevent the head from spraying buildings, over sidewalks, parking lots, ect.. If necessary, change nozzle sizes to accommodate necessary throw.

F. During the course of the installation, the Contractor shall take an and all means necessary to insure that the water supply to the landscapes of the Library and Mesa Building remain operational at all times.

G. The Contractor shall be responsible for the placement of all sleeves necessary for irrigation construction. All sleeves shall be Schedule 40 pvc. All sleeves shall be 6” diameter and capped, flagged, and buried 24” below finished grade. Any pavement span greater than 24” shall receive a sleeve.

3.2 EXCAVATION AND BACKFILL, GENERAL

C. All excavation in this project shall be unclassified and is to include earth, loose rock, rock or any combination thereof. The Contractor shall not be allowed extra compensation should hard soil or rock be encountered on this project.

D. All trenches shall be backfilled with the material removed except where special backfill specifications or certain pipe may specify otherwise. No surplus or discarded material or debris shall be included in the backfill. All excess backfill shall be removed from the campus. All trenches and adjoining areas shall be hand-raked so to leave the grade in as good or better cover-up inspection condition than before installation.

E. All trench backfill shall be flooded and compacted in order to prevent settling.

F. All installed work will be made available for inspection by the Owner’s Inspector before backfill and cover-up may be done.

3.3 FINAL CLEAN-UP

Upon completion of the work and before acceptance and final payment will be made, the Contractor shall clean and remove from the site all surplus and discarded materials and debris.

3.4.1 ELECTRIAL WORK

A. The Contractor is responsible for all electrical work, including booster pump installation, required to satisfy the end result of this project. All wires that are cut while trenching shall be spliced and put in a grey valve box and indicated on as-built drawings. All electrical work must be inspected and approved by the Owner's Inspector. All wire splices shall be DBY or DBR type splices or other as approved by Owner in writing.

3.5 PIPE INSTALLATION

A. General

1. Sprinkler mains shall be installed in an 8" wide trench with a minimum of 24" cover.
2. Lateral piping shall be installed in a 6" wide trench, deep enough to allow for the installation of sprinkler heads and valves as per detailed installation instructions for each item, but in no case shall lateral lines be installed with less than 18" of cover.

B. PVC Pipe

1. All rubbish and rocks shall be removed from the trenches. Pipe shall have a firm, uniform bearing for the entire length of each pipeline to prevent uneven settlement. Pad the trenches with dirt or sand should the soil be extremely rocky.
2. Never lay PVC pipe when there is water in the trench or when the temperature is 40 degrees or below.
3. Piping shall be kept clean and all foreign matter or dirt shall be removed from inside the pipe before solvent welding and after laying of pipe.
4. Water flooding of trenches is required before and during backfill. Tamping of backfill soil shall be done to the satisfaction of the Owner.
5. The Contractor is cautioned to use care in the handling of the pipe. Any pipe that is cracked, dented, or damaged will be discarded and shall not be used on this project.
6. Any PVC fitting larger than 2-1/2" shall have a concrete thrust block installed.

C. PVC Pipe and Fitting Assembly

The Contractor shall use only the solvent supplied and recommended by the manufacturer to make solvent-welded joints. The Contractor shall follow these steps in applying the solvent:

1. Apply an even coat of solvent to the outside of the pipe. Then apply solvent to the inside of the fitting, make sure that the coated area on the pipe is equal to the depth of the fitting socket.

2. Insert pipe into the fitting and turn the pipe 1/4 turn. Check all tees and ells for correct position, then hold joint for 15 seconds so that the pipe is firmly welded to the fitting.

3. Allow 15 minutes set-up time for each welded joint before moving.

4. Where threaded PVC connections are required, use threaded PVC adapters into which the pipe may be welded. Teflon tape only will be used on threads. Absolutely no "pipe dope" will be used.

5. All pipe and fittings 2-1/2" and larger shall be sanded prior to applying solvent. Several PVC joints shall be randomly selected and removed from the piping system for inspection. The number of joints removed shall be dependent on the number of joints found to be not properly bonded.

3.6 HEAD INSTALLATION

A. All soil within a 12" radius of the heads shall be heavily compacted so as to prevent damage to the head or riser.

B. All lines shall be flushed thoroughly prior to the installation of the heads.

PART 4 - WARRANTY AND GUARANTEE

4.1 MATERIALS AND WORKMANSHIP

A. Materials and workmanship shall be fully guaranteed for one (1) year after installation and acceptance of the system. Replacement of defective material or repair of work shall be done at no expense to the Owner during the first year, except for repairs or replacement necessitated by damage not of Contractor’s making.

B. Raising and lowering heads to the proper height, filling trenches that have settled, packing the earth firmly around the heads and quick couplers will be considered part of the warranty work and done at no charge to the Owner for one year after acceptance of the system.

C. The Contractor will provide the Owner with a record drawing showing the dimensional location of all electric valves, wire routes, mainline routes, lateral routes, location of heads, etc.

D. The Contractor shall provide operating instructions and maintenance instructions to the Owner in writing at time of completion.

E. The Contractor will provide service and maintenance manuals on all major items in the installation.

F. Maintenance and guarantee as stated above does not include alterations necessitated by re-landscaping, addition of trees, re-grading, or the addition and changes in walks, walls, driveways, etc.

END OF SECTION

SECTION 32 91 00
LANDSCAPE PLANTING

PART 1 - GENERAL

1.1 SUMMARY

RELATED DOCUMENTS:

A. All work shall be done in accordance with all applicable ordinances of the City of Wichita Falls, Texas, and Midwestern State University.

B. Any and all permits, licenses, ect., or other requirements shall be supplied by the Contractor. Applicable provisions of conditions of the contract and special conditions govern this work.

1.2 DESCRIPTION OF WORK:

The extent of the landscape installation work is shown in the drawings that accompany these documents. Where there is any doubt as to the degree of work to be completed, it is the Contractor's responsibility to contact the Owner or the Landscape Architect in writing in order to clarify the situation. The Contractor will be held responsible for completing all work shown in contract, regardless of cost incurred to his business, if he fails to perform any part of this contract.

1.3 JOB CONDITIONS:

A. Site Examination: The Contractor shall make an examination of the site of the proposed work and completely familiarize himself with the nature and extent of the project. No extra compensation will be allowed for any work made necessary by unusual conditions of obstacles encountered during the process of the work, when conditions or obstacles are readily apparent upon a visit to the site. If there are any discrepancies between the drawings and the actual site conditions, the Contractor shall notify the Owner and the Landscape Architect prior to the submission of bids.

B. Utilities: During execution of the work, utmost care shall be exercised to prevent damage to any utility, structures, or right-of-way. The Contractor shall be responsible for locating and protecting all underground utilities and structures. Any damage to existing utilities and/or structures shall be paid for at the Contractor's expense. If in the course of work, underground utilities are encountered and are in conflict with the Contractor's work, the Contractor shall contact the Owner and the Landscape Architect immediately, and they will recommend necessary adjustments. Changes of this nature are considered incidental to the work and shall not entitle the Contractor to additional compensation.

C. Excavation: When conditions are met below grade that may prove detrimental to the health of the plant material, the Contractor shall immediately notify the Owner and the Landscape Architect. A rock allowance will not be granted on this project.

D. Planting Time: Plant or install materials during normal planting seasons for each type of landscape work required. Should question arise as to the most suitable time for any or all of the plant material to be installed, the Contractor shall present in writing to the Landscape Architect

and Owner justification for postponing installation until stated. It is the Contractor's responsibility to notify the Owner prior to installing any plant material. The Owner has the right to suspend planting of any material for a period of up to 180 days at no additional incurred cost.

1.4 QUALITY ASSURANCE:

A. Experience: The Contractor shall have had a minimum of 3 years previous experience in installing landscapes in the climate in which this installation is taking place. Contractor shall provide the Owner with a list of at least 3 previous jobs that had a similar budget and project scope. Contractor shall provide names, addresses, and phone numbers of clients on these jobs so that the Owner may check references. Contractor shall be insured firm that specializes in landscape work, and shall be fully licensed to perform any or all tasks that require licensure by the State of Texas.

B. Substitutions: When the Landscape Architect is furnished sufficient evidence that a specified plant or product cannot be practically obtained on the market, the Landscape Architect may approve in writing the use of approved alternate material. Any substitutions must be made prior to bid submittals. Substitutions made without written consent of the Landscape Architect will be rejected.

C. Standards: All nursery stock shall conform to or exceed those standards as set forth in the most recent publication of "American Standard for Nursery Stock", as published by the American Association of Nurserymen. Where discrepancies arise as to the common name of a plant versus the scientific name of a plant, the scientific name shall govern.

D. Labeling: All labels shall be removed from materials after inspection by the Landscape Architect or a representative of the Owner.

E. Inspection: The Owner has the option to review, accept, or reject, any or all plant material at any time during the installation. When plant material is rejected, there shall not be any additional cost incurred to the Owner or the Landscape Architect.

F. Transportation, Acceptance, and Delivery: All trees, shrubs, groundcovers, bedding plants, and vines shall be transported to the Contractor's holding yard by a fully enclosed or heavily tarped transport. The Contractor shall contact the Landscape Architect 24 hours before the material arrives. After the material has arrived at the holding yard, the Landscape Architect shall inspect all materials to insure compliance with specifications. Any or all plant material that does not meet the set specifications shall be rejected at this time, and all cost associated with securing new material in a timely basis shall be incurred by the Contractor. After inspection, the Contractor shall carefully coordinate a schedule with the Owner, Landscape Architect, and Contractor for installation. Delivery shall be made to the job site by a fully enclosed or tarped trailer. Plant material cannot be left on the job site overnight, and the Contractor shall not be allowed to leave any holes uncovered at any time other than the actual time of installation. The Contractor shall not be allowed to store any equipment, vehicle, or machinery on the Owner's property at any time during the contract's duration.

1.5 SUBMITTALS:

A. OWNER'S Right to Waive Submittal Formalities: The Owner reserves the right to waive any or all formalities associated with submittals or product quality if it feels that it is in the Owner's best interest.

B. Certification: Submit any and all state and federal certifications stating that the plant materials are free from disease and insects. Submit proof of any and all state or federal certifications or licensing for those individuals whose trades require certification or licensure.

C. Fertilizers: The Contractor shall submit a list of all fertilizers and/or chemicals that will be used on the property. MSDS sheets shall accompany those submitted.

D. Mulch: The Contractor shall submit 1 bag of the specified mulch for approval by the Landscape Architect. The bag shall be the original bag that the product was packaged in, or if in bulk, a copy of product specifications from the manufacturer shall be submitted for approval prior to delivery.

E. Soil Amendments: All soil amendments must be submitted prior to installation in the planting areas. Certification of product source must accompany submittal. If the product is packaged, the package must be the original that the material was shipped in.

F. Soil Samples: The Owner can, at it's expense, test the existing soils on the site and provide a copy of the results to the Contractor.

1.6 PROJECT WARRANTY:

A. The Owner reserves the right to waive all warranties and guarantees if it feels that is in it's best interest to do so. All such notices must be in writing and signed by a representative of the Owner.

B. Trees, Shrubs, and Vines: All trees, shrubs, and vines shall be guaranteed for a period of two (2) years after the date of substantial completion as set forth by the Landscape Architect. Reason for replacement shall include death or unsatisfactory growth. The Contractor is not responsible for replacement if the plant material is deemed to have died as a result of Owner negligence, fire, hail, windstorm, lightning, gas leaks, or abuse or damage by others. In the event a replacement is needed during the year, the Contractor shall notify the Owner prior to the installation. All replacements shall be equal to or better than the quality of the plant materials being replaced. The Owner shall bear no cost whatsoever in replacements. Replacements shall be made during the season deemed most acceptable for plant success by the Landscape Architect.

C. Groundcovers: All groundcovers in containers of 4 inches or less shall be guaranteed for 1 year after the date of substantial completion. Any material that is not performing to the Landscape Architect's expectations during this period shall be replaced at no expense to the Owner.

D. Grass: Grass areas that have been sodded, seeded, sprigged, or hydromulched shall be guaranteed to provide a full and vigorous stand of grass within 90 days after the date of installation. During that time frame, the Contractor shall monitor the condition and maintenance of the growing grass, and shall re-seed, hydromulch, or sprig areas where coverage is not 100%,

as determined by the Landscape Architect. Where, after the 90 day growth period, grass has not germinated and grown to the satisfaction of the Owner, the Contractor shall be required to replace with quality sod, all of those areas in question at no cost to the Owner.

1.7 PRODUCTS:

A. Planting Mix: Planting mix material used for backfilling all planting pits shall be prepared in the following proportions by volume. Entire bed areas do not need preparation, only the area within 3 times the size of the container that the plant was delivered in shall be prepared.

70% Sandy-Loam Topsoil equal to that described under item A.1.2 below.
30% Organic Mulch material as described under item A.1.1 below:

1. Organic Mulch: Soil amendment material as required in the backfill mix shall be 100 percent organic sterile composted material equal to that as manufactured by:

Back to Earth Resources, Inc.
5535 Vale Blvd., Suite 200
Dallas, Texas, 75206 Ph. 800-441-2498

2. Topsoil: Soil shall be a red sandy-loam soil similar in characteristics as existing soil in the area. Soil shall be free of noxious weeds, grass, nutgrass, sterilants or other chemicals, trash, and any other debris or item that may prove detrimental to the overall health of the plant. Soil amendment shall be tilled into the sandy-loam soil at a depth of no less than 14 inches. After installation of plant materials, all beds shall be covered with a minimum of 3 inches of decomposed granite, a sterile hardwood mulch, or an approved equal.

B. Fertilizer: All fertilizer used shall be delivered in bags or containers clearly labeled showing the product's analysis. A mycorrhizal fungi planting inoculant shall be used in all bed areas and around all trees on this project. The guaranteed analysis shall consist of 4% nitrogen, 7% phosphorus, and 4% potassium, plus micronutrients. Fertilizer shall be evenly distributed in all bed areas where plants will be installed at the rate of 25 pounds per 500 square feet prior to the installation of the plant material. Installation should only occur directly in the location of the new plantings, and not in areas of cobblestone. All walks or other concrete areas adjacent to the beds shall be thoroughly swept in order to prevent fertilizer from staining surface when wet. The beds shall then be thoroughly flooded so as to assure water penetration to the base of the plant's root zone. All trees shall receive endo and ecto-mycorrhizal fungi at a rate of 3 oz. per 1" caliper DBH of tree.

C. Decomposed Granite: The work required for the decomposed granite installation includes the furnishing all materials, labor, tools and equipment, and in performing all operations necessary to complete installation of decomposed granite paving areas and related work in accordance with the drawings and specifications and subject to the terms and conditions of the contract or as directed by the Landscape Architect. The areas to receive decomposed granite shall be finished accurately to the grades and cross-sections as shown on the plan. The subsurface material shall be compacted to 95% of maximum density, at optimum moisture, as determined by the A.A.S.H.O. Method T-99-82. The exact amount of all materials shall be determined in the field in order to produce the desired durability, density, and uniformity. Provide a one-quart size submittal for approval. A source for decomposed granite may be found at:

MAG Materials
Phone: 325-251-6684
or
Alamo Stone
Phone: 281-240-4600

1. Clean, hard, durable particles or fragments of .75" minus of a color to be selected by the Owner. Material shall be made from decomposed granite. Fines shall be evenly mixed throughout the aggregate. When produced from gravel, 50% by weight of the material retained on a No. 4 sieve shall have one fractured face.

2. The portion retained on the No. 4 sieve shall have a max. percentage of wear of 50 at 500 revolutions as determined by AASHTO T96-77.

3. The portion passing a No. 40 sieve shall have a max. liquid limit of 25 and a max. plasticity index of 7, as determined by AASHTO T89-81 and AASHTO T90-81, respectively.

4. The decomposed granite shall be free from clay lumps, vegetable matter, and deleterious material.

5. All decomposed granite shall be installed over a permeable geotextile fabric to a minimum of 2.5" in depth (settled).

Grading requirements shall be based on AASHTO T11-82 and T27-82 and shall consist of :

Sieve	Passing	Sieve	Passing
3/8"	100%	No. 30	40-50%
No. 4	95-100%	No. 50	25-35%
No. 8	75-80%	No. 100	20-25%
No. 16	55-65%	No. 200	5-15%

D. POND LEDGE STONE AND BOULDERS: The stone used for the ledge or coping of the pond shall be Hadrian Limestone from Texas Stone Quarries, www.texastone.com. The material shall be sized as shown in the drawing details. All exposed edges shall be "broken" to resemble a natural setting. Exposed flat surfaces shall be quarry "roughbacks", which is the natural exposed surface in the field. Contractor to make every effort to provide a natural settting with placement and edge treatments of the pond and exposed stones. Boulders placed as shown in the drawings shall be a limestone or sandstone and sized as shown on the site plans. All boulder shall be buried to a depth equal to 25% of their total height so as to appear natural in setting. Strapping shall be preferred to cable placement of the stones, as any stone which has disfiguring manmade marks shall be rejected. Contractor to provide photographic submittals of boulders for approval, or shall have the boulders in their place of business for field inspection prior to installation.

1.8 PLANT MATERIALS:

A. Container Grown Plants: All plant materials specified shall be nursery grown stock in containers unless otherwise stipulated. All plants shall be sound, disease free, and shall be no smaller than the specifications set forth in these drawings and documents. Container stock shall have grown in

their containers for at least six (6) months, but no more than two (2) years. Samples must prove that no root bound conditions exist. Field grown plants recently transplanted into containers will not be accepted. All nursery stock shall conform to or exceed those standards as set forth in the most recent publication of "American Standard for Nursery Stock", as published by the American Association of Nurserymen. The specifications in these documents shall be considered to be the ruling guidelines. The following specifications represent quantity, size, and general description.

1.9 PLANTING:

A. Installation of Plant Materials:
After bed preparation has been completed, the Contractor shall lay out the plant material for location approval by the Landscape Architect. After approval, the Contractor shall dig a hole approximately 20% wider than the plant that is to be installed in that location. The hole shall also be approximately the same depth as the plant is placed in it's container. With care, the Contractor shall place the plant in the hole, plumb level, and gently backfill soil into the void around the plant. The soil shall be no higher than the top of the plant's original surface, but the surface shall also not be higher than 1/4 inch above the surrounding grade. The soil shall then be carefully packed around the so that it provides a firm, stable environment for the plant. After such installation, a water hose shall be used to 'water-pack' the soil around the newly installed plant. This will serve to settle the soil and remove all air pockets that may have formed. All trees not in a designated planting bed shall have soil piled up around the exterior of the root ball so as to provide a "dish" of 2 inches high that will allow the tree to water properly. If the tree is to be place in rows, such as the Cedar Elms, then the Contractor shall use any means necessary to assure that the trees are lined up in a straight and uniform manner as shown on the drawings.

B. Seeding and Sodding: In the areas designated as "Lawn" on the drawings, the Contractor shall till the existing soils to a depth of 6" and then rake smooth so as to provide a flat, non-undulating soil base free of clods, weeds, rocks or other materials not appropriate in a typical lawn area. Sod shall not be laid on caliche or similar material brought it for the building pad construction. Where areas are to be sodded, soils shall be non-compacted and generally loose and friable. The Contractor shall lay the sod evenly and at a 90-degree angle from the drip irrigation lines. After installation, the sod shall be wetted and rolled with a sod roller so as to provide a smooth and even surface without ridges, netting, rocks, or bumps. Immediately after installation, a new lawn starter fertilizer such as Fertilome's New Lawn Starter shall be applied at the manufacturer's recommended rates. Watering shall commence within 6 hours after installation of sod. Sod shall not be stored in the parking lots or on any pavement, and must be delivered from the grower's yard within 24 hours of being cut. Installation on the job site must occur within 8 hours after delivery to the site.

C. Watering: After installation, all plant materials shall receive adequate watering to insure they remain healthy and vigorous throughout the project. The Contractor is responsible for providing all methods and materials necessary to insure this takes place. In the event of irrigation system failure during the construction process, plant losses incurred shall not be the responsibility of the OWNER. Where necessary, the Contractor shall move adjacent irrigation heads to within the water dish provided.

D. Pruning: Unless otherwise stated in writing, no plant or tree material shall be pruned prior to installation. However, the Contractor shall, if directed by the Landscape Architect, prune any plant or tree material to the satisfaction of the Landscape Architect.

E. Excavation: The Contractor shall not leave any holes uncovered overnight at any time during the project. The Contractor shall take every measure possible to prevent injury to pedestrians due to excavation or other landscape construction.

PART 2 - PROTECTION OF EXISTING TREES AND SHRUBS:

A. Goal: To protect existing campus trees and shrubs from the negative impacts of construction.

B. Scope: Provide complete protection and maintenance of existing trees and shrubs designated to remain within construction limits.

C. Coordination: Coordinate protection of existing trees and shrubs with other trades to prevent damage to trees and shrubs.

D. Compensation for Damages: If existing trees or shrubs are destroyed, killed, or badly damaged as a result of construction operations, contract sum will be reduced by the amount of assessed damages. The Owner will be responsible for evaluating all damages.

E. Materials: Acceptable tree and shrub protection barricade materials are plastic orange construction fence and steel t-posts.

F. Protection: Protect existing trees and shrubs within construction limits for the following damages:

1. Compaction of root area by equipment, vehicles or material storage.
2. Trunk damage by moving equipment, material storage, nailing, bolting, or painting.
3. Strangling by tying ropes or guy wires to trunks or branches.
4. Poisoning by pouring solvents, gas, paint or other chemicals around roots.
5. Cutting of roots by excavation or ditching without Owner's written permission.
6. Damage of branches by improper pruning without the Owner's written permission.
7. Drought from failure to water or changes in normal drainage pattern.
8. Changes of soil pH by disposal of lime materials such as concrete or plaster.
9. Damage by cutting roots greater than 1 ½" diameter without the Owner's written permission. Excavation and earthwork within protection-zone of trees shall be done by hand unless otherwise permitted in writing by the Owner.
10. Install barricade protection around trees and shrubs with construction limits by utilizing materials listed under the materials heading of this section or other Owner approved materials. Barricade protection will be installed prior to the start of demolition or excavation operations. Barricade protection shall remain in place until construction operation are complete. Barricades shall be installed around the trees to be preserved at ratio of 10" per every caliper inch of trunk measured at breast high (DBH). For example: A live oak tree measuring eight (8) inches diameter at approximately breast height shall have a barricade placed completely around the tree not closer than six (6) feet from the trunk unless otherwise specified by the Owner. Protection zone radius = 0.75 ft. x DBH.

G. Trees and shrubs to be removed shall be the responsibility of the Owner prior to construction operations. The Owner shall tag trees and shrubs to be preserved prior to excavation.

H. As shown on the drawings, some trees may need to be relocated to other areas on the Campus. When this is required, the Contractor shall use a mechanical tree spade to dig the new tree hole, as well as to relocate the existing tree. All standard TAN methods of tree relocation shall be followed to insure the successful transplant. While every method and procedure shall be utilized to insure the survival of the transplanted trees, these trees shall not be included in the guarantee phase of this landscape.

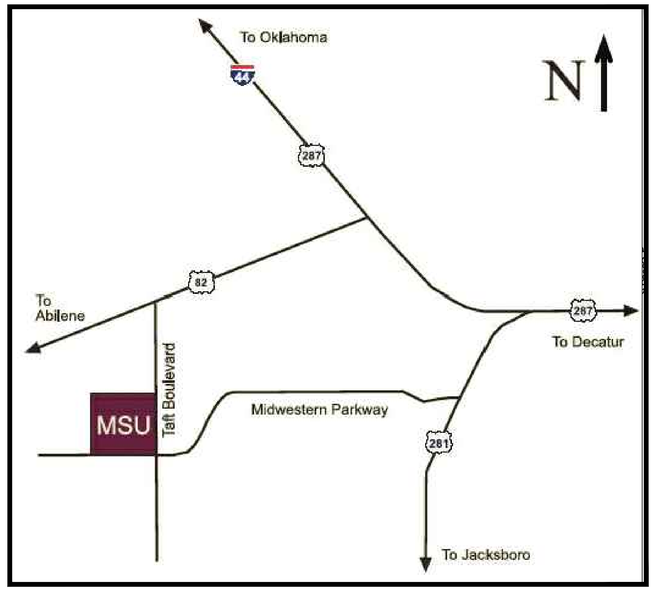
END OF SECTION

MIDWESTERN STATE UNIVERSITY

CAMPUS DEVELOPMENT PLAN

HS + HS QUAD PLANS

ISSUE FOR BID



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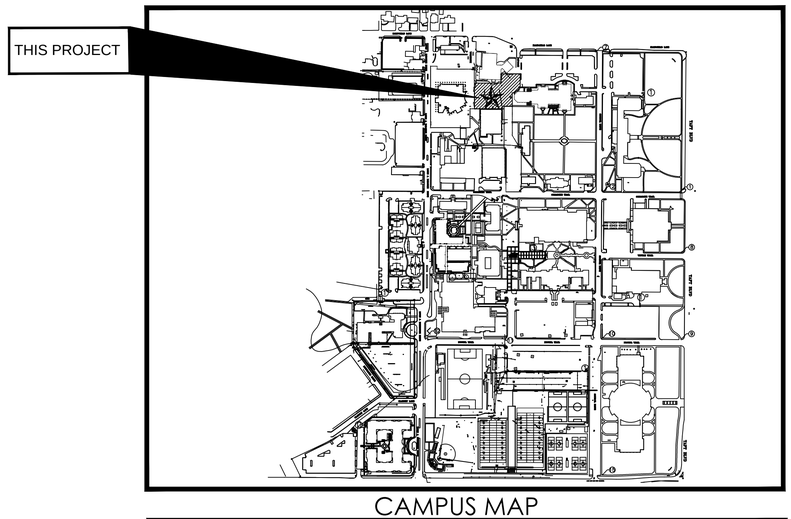

CAMPUS MAP

SHEET INDEX

PRESIDENT

DR. SUZANNE SHIPLEY

PROVOST

DR. JAMES JOHNSTON

VP FACILITIES SERVICES

KYLE OWEN

REGISTERED LANDSCAPE ARCHITECT
JONATHAN L. H. PRESSLEY
3006
STATE OF TEXAS
3.6.18

4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
Phone: 432.686.8001
Facsimile: 432.683.3487
www.KDCAssociates.com

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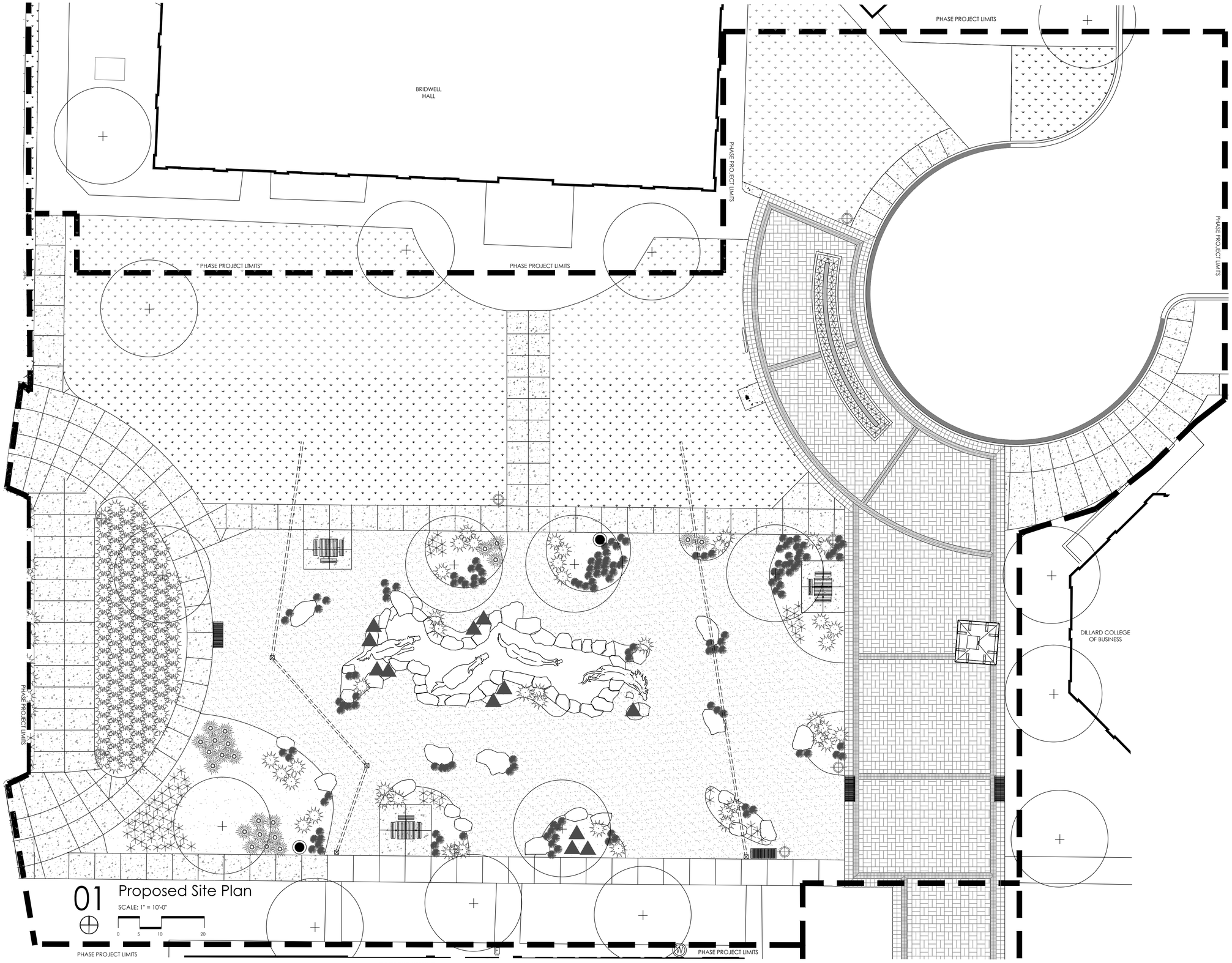

01 Proposed Site Plan

SCALE: 1" = 10'-0"

GENERAL NOTES AND CONDITIONS:

1. VERIFY EXISTING SITE INFORMATION, INCLUDING STRUCTURES, UTILITIES, PROPERTY LINES, LIMITS OF ROADWAYS, AND CURB/GUTTERS, THAT MAY EFFECT THE SCOPE OF WORK PRIOR TO BEGINING SITE CONSTRUCITON.

2. EXISTING UTILITIES ARE INDICATED FOR INFORMATION ONLY AND NOT INTENDED TO SHOW EXACT LOCATION. THE OWNER'S REPRESENTATIVE IS NOT RESPONSIBLE FOR THE LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN OR DETAILED AND INSTALLED BY ANY OTHER CONTRACT. THE CONTRACTOR SHALL LOCATE ALL UTILITIES AND MAINTAIN THE LOCATION DURING ALL PHASES OF THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO UTILITIES OR STRUCTURES AND ANY INJURIES THEREFROM. RESTORATION OF ANY UTILITIES DAMAGED BY THE CONTRACTOR SHALL BE AT THE CONTRACTORS EXPENSE TO THE SATISFACTION OF THE OWNER.

3. THE CONTRACTOR SHALL TAKE ALL NECESSARY STEPS AS REQUIRED TO PROPERLY PROTECT AND MAINTAIN HIS WORK FOR THE DURATION OF THIS CONTRACT. EQUIPMENT SHALL BE REMOVED OR SECURELY AFFIXED TO SITE AT END OF WORK DAY. DAMAGE OR THEFT OF EQUIPMENT IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR, AND ANY INJURY OR OTHER LIABILITY ARISING FROM EQUIPMENT OR MATERIALS LEFT OR STORED ON SITE SHALL SOLELY BE THE RESPONSIBILITY OF THE CONTRACTOR.

4. PROVIDE WRITTEN NOTIFICATION OF ALL DISCREPANCIES BETWEEN EXISTING AND PROPOSED SITE IMPROVEMENTS.

5. ALL WORK SHALL COMPLY WITH ALL APPLICABLE CODES AND ORDINANCES OF THE CITY IN WHICH THE PROJECT IS LOCATED, AND THE STATE OF TEXAS.

6. ANYTHING MENTIONED IN THE TECHNICAL SPECIFICATIONS AND NOT SHOWN ON THE DRAWINGS, OR SHOWN ON THE DRAWINGS AND NOT MENTIONED IN THE TECHNICAL SPECIFICATIONS SHALL BE OF LIKE EFFECT AS IF SHOWN OR MENTIONED IN BOTH. IN CASE OF A DISCREPANCY BETWEEN THE DRAWINGS AND TECHNICAL SPECIFICATIONS, THE MATTER SHALL BE IMMEDIATELY SUBMITTED TO THE OWNERS REPRESENTATIVE. WITHOUT HIS DECISIONS, SAID DISCREPANCY SHALL NOT BE ADJUSTED BY THE CONTRACTOR, SAVE ONLY AT HIS OWN RISK AND EXPENSE.

7. CONTRACTOR SHALL STAKE OUT PLAN TO ITS FULL EXTENT AND SHALL OBTAIN THE APPROVAL OF THE LANDSCAPE ARCHITECT AND OWNER, MAKING MODIFICATIONS AS REQUIRED PRIOR TO PROCEEDING WITH THE WORK.

8. NOTES AND DETAILS ON SPECIFIED DRAWINGS TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.

9. ALL FINISHED GRADES SHALL PROVIDE FOR NATURAL RUNOFF OF WATER WITHOUT LOW SPOTS OR POCKETS. UNLESS SPECIFICALLY DRAWN AND DETAILED, ALL FLOW SHALL BE AWAY FROM ALL STRUCTURES ON SITE, AND SHALL ONLY CROSS SIDEWALKS OR OTHER PEDESTRIAN FLOW AREAS WHERE ABSOLUTELY NECESSARY.

10. HOLD FINISHED GRADES FOR PLANTING LAWN AREAS 1.5" BELOW TOP OF ADJACENT PAVEMENT. ALL FINISHED GRADES FOR PLANTING BEDS SHALL BE HELD AT 1" BELOW TOP OF ADJACENT PAVEMENT.

11. GRADUALLY ROUND OFF TOPS AND TOES OF ALL PLANTED SLOPES TO PRODUCE A SMOOTH ARCHITECTURAL TRANSITION BETWEEN RELATIVELY LEVEL AREAS AND SLOPES, UNLESS SPECIFICALLY DETAILED IN THE LANDSCAPE GRADING DETAILS.

12. ALL PAVING AREAS IN EXCESS OF 36" IN WIDTH SHALL HAVE LANDSCAPE SLEEVING PROVIDED. ALL SLEEVING SHALL BE A MINIMMUM OF 18" AND A MAXIMUM OF 24" IN DEPTH. SLEEVES SHALL EXTEND A MINIMUM OF 12" BEYOND THE EDGE OF ADJACENT PAVEMENT. SLEEVES SHALL BE CAPPED AND MARKED WITH FLAGS OR STAKES FOR FUTURE IDENTIFICATION. ALL SLEEVES SHALL BE A MINIMUM OF 4" SCH. 40 PVC PIPE IN STANDARD AREAS, AND SHALL BE 6" SCH. 40 PVC PIPE IN AREAS WHERE IRRIGATION MAINLINES ARE MARKED TO CROSS. A MINIMUM OF 2 SLEEVES SHALL BE USED WHENEVER ANY SLEEVING IS NECESSARY.

13. ALL EXISTING TREES AND VEGETATION SHOULD BE CONSIDERED AS REMAINING UNLESS OTHERWISE SPECIFICALLY SHOWN. DO NOT REMOVE ANY TREES WITHOUT SPECIFIC PERMISSION FROM THE LANDSCAPE ARCHITECT. ALL TREES SHALL BE PROTECTED BY A MINIMUM 3' TALL VINYL SNOW FENCE OR SIMILAR BARRIER. FENCING SHALL BE PLACED UNDER THE OUTERMOST EDGE OF THE CANOPY OF THE TREE. NO VEHICULAR TRAFFIC SHALL BE ALLOWED UNDER ANY TREE CANOPY FOR ANY REASON. NO SOLVENTS, THINNERS, PAINT, CONCRETE WASH, OR OTHER MATERIALS SHALL BE DISBURSED UNDER THE CANOPY OF ANY TREE.

14. UNLESS SPECIFICALLY INDICATED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION, MAINTENANCE, AND RESTORATION OF ANY ELECTRICAL, IRRIGATION AND DRAINAGE SYSTEMS ON SITE.

15. CONTRACTOR SHALL TAKE ALL NECESSARY STEPS TO NOTIFY ALL UTILITY COMPANIES PRIOR TO ANY DIGGING, TRENCHING, OR EXCAVATION ON SITE. CONSTRUCTION MAY NOT BEGIN PRIOR TO PROPER AND ACCURATE MARKING OF UNDERGROUND UTILITIES AND SECURING OF ANY AND ALL APPLICABLE PERMITS.

16. THE ELEMENTS WITHIN THIS PROJECT FALL WITHIN THE AMERICANS WITH DISABILITES ACT, AND AS SUCH, ALL SIDEWALKS, GRADES, AND BUILDING ELEMENTS MUST COMPLY.

17. HOLES, TRENCHES, PITS, OR OTHER ELEMENTS WHICH COULD CAUSE FALLS OR OTHER ACCIDENTS SHALL BE FULLY PROTECTED AND MARKED BY THE CONTRACTOR, WHO ASSUMES FULL LIABILITY FOR ANY INJURIES OR DAMAGES CAUSED BY CONSTRUCTION.

18. SPEED AND COORDINATION OF CONSTRUCTION ELEMENTS AND WORK TRADES IS ESSENTIAL FOR THIS PROJECT AND CONTRACTOR SHALL USE ALL NECESSARY METHODS TO IMPLEMENT BOTH.

PROPOSED CONCRETE

PROPOSED TURF

PROPOSED STABILIZED DG

PROPOSED DECOMPOSED GRANITE

PROPOSED PAVER PLAZA

KDC Associates
4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
Phone: 432.684.8051
Fax/alt#: 432.683.3487
www.KDCassociates.com
Environmental Planning
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REGISTERED LANDSCAPE ARCHITECT
JONATHON L. H. PRUESSNER
3006
STATE OF TEXAS

3.6.18

Texas811
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MIDWESTERN STATE UNIVERSITY
WICHITA FALLS, TX

HS + HS QUAD DEVELOPMENT PLANS

Date: 12.21.17
Revisions: 1.16.18
3.6.18

Scale: 1"=10'-0"

Site Plan

Sheet No.

L-1.0

MAC-Civil, KDC Automatic 11/2/2015 4:34 PM KDC Standard 22x34.dwt

KEY NOTES:

1. PHASE PROJECT LIMITS

CADDO TRAIL

BRIDWELL HALL

CONCRETE WALK

12" ELM

18" LIVE OAK

4" MAGNOLIA

CONCRETE WALK

120° CIRCUMFERENCE VITEX

24" RED OAK

6" WALNUT

PLAQUE

NO PARKING

PLAQUE

4" RED OAK

26" RED OAK

PLAQUE

5" MAGNOLIA

DILLARD COLLEGE OF BUSINESS

6" MAGNOLIA

6" RED OAK

CONCRETE FLUME

TIME CAPSULE

22" BUR OAK

BRICK SIGN

CONC. WITH PICNIC TABLE

24" JUNIPER TREE

10" LIVE OAK

FL EARTHEN FLUME

16" BUR OAK

CONCRETE WALK

16" BUR OAK

20" BUR OAK

24" CEDAR

18" BUR OAK

MCCOY ENGINEERING HALL

01 Existing Conditions

SCALE: 1" = 10'-0"

0 5 10 20

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HS + HS QUAD DEVELOPMENT PLANS

WICHITA FALLS, TX

Date: 12.21.17
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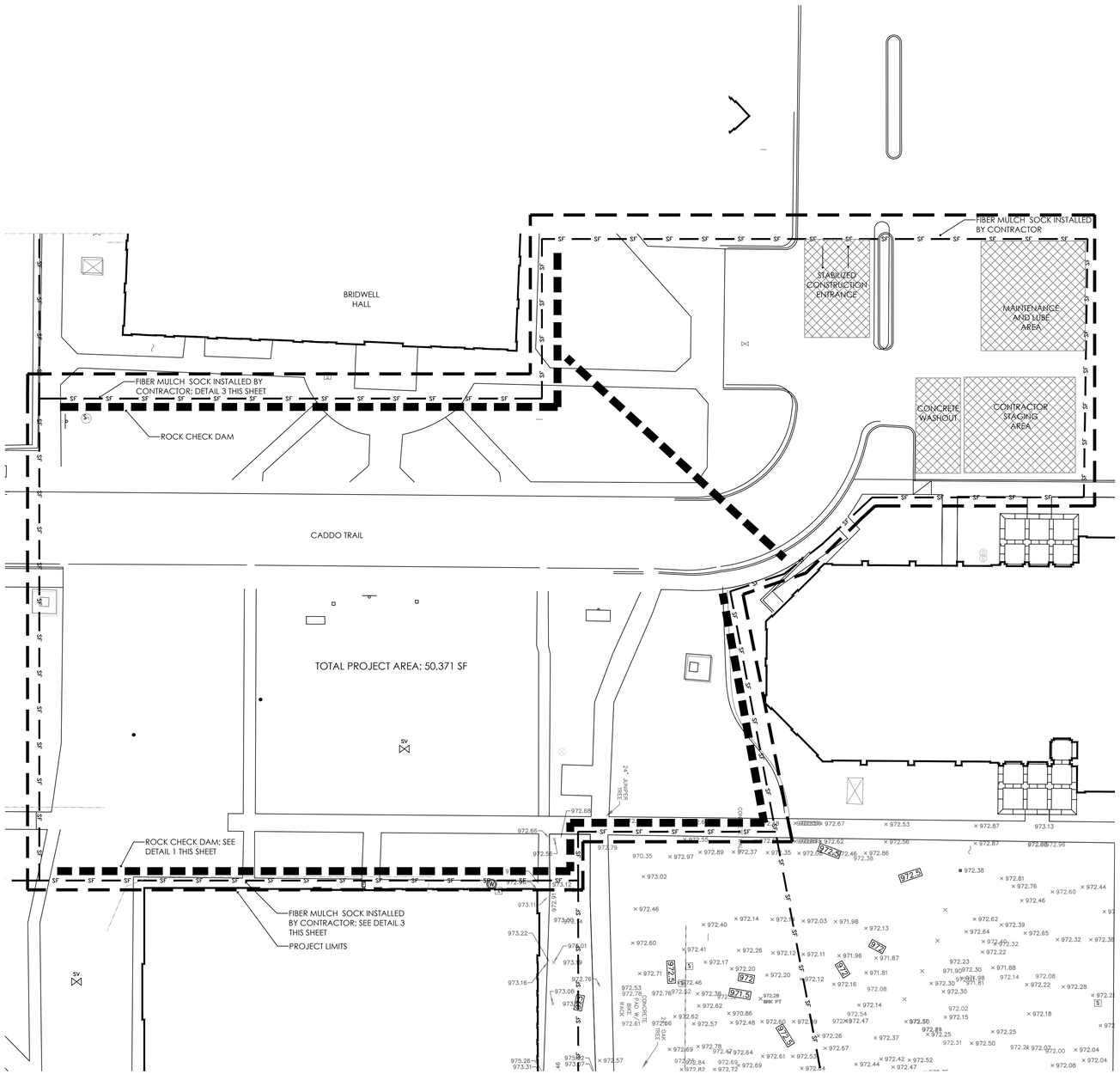
Scale: 1"=10'-0"

Existing Conditions

Sheet No.

L-2.0



01 SWPPP

SCALE: 1" = 20'-0"

0 10 20 40

GENERAL SWPPP NOTES:

1. CONCRETE BATCH PLANTS, HOT MIX ASPHALTIC CONRETE PLANTS, AND FILL MATERIAL SOURCES ARE LOCATED AT OFF-SITE FACILITIES.
2. AREAS FOR STAGING CONSTRUCTION TRAFFIC, PARKING, VEHICULAR MAINTENANCE, CONCRETE TRUCK WASHING, AND VEHICLE WASHING SHALL BE WITHIN THE LIMITS OF THE SWPPP PERIMETER CONTROLS. STAGE AREAS TO INCLUDE ALL LOCTATIONS TO BE NOTED BY THE CONTRACTOR, FUEL STORAGE AREA, AND PORTA-TOILET LOCATIONS.
3. THE SWPPP CONTROLS WILL BE INSTALLED BY THE CONTRACTOR, WHO SHALL ALSO FILE ALL NECESSARY TCEQ PERMIT DOCUMENTS (NOI, NOC, NOT).
4. ALL OPERATORS SHALL COMPLY WITH INSPECTION, MAINTENANCE AND REPORTING REQUIREMENTS OF THE GENERAL PERMIT.
5. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 32' OF THE TEMPORARY CONCRTE WASHOUT FACILITY.
6. CONCRETE WASHOUT PLASTIC LINER SHALL BE ANCHORED WITH GRAVEL FILLED BAGS.
7. PLASTIC LINER SHALL BE MIN. 20 MIL THICKNESS.

EROSION CONTROL NOTES:

1. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PHASE OF THE PROJECT ACCORDING TO THE FOLLOWING SCHEDULE:

A. FILTER FABRIC (SILT) FENCE OR FIBER MULCH SOCKS:
   a. ACCUMULATED SEDIMENTS WILL BE REMOVED AS REQUIRED TO KEEP THE BARRIER FUNCTIONAL
   b. ALL UNDERCUTTIN OR EROSION OF THE TOE ANCHOR WILL BE REPAIRED IMMEDIATELY WITH COMPACTED BACKFILL MATERIAL
   c. ADHERE TO ANY MANUFACTUER'S RECOMMENDATIONS FOR REPLACING FILTER FABRIC OR FIBER MULCH SOCKS DURING CONSTRUCTION

2. SITE INSPECTIONS MUST BE MADE AT LEASTE ONCE EVERY 14 DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT 5" OR GREATER OR AT LEAST EVERY 7 DAYS REGARDLESS OF PRECIPITATION.
3. AS SITE CONDITIONS CHANGE, NECESSARY ADJUSTMENTS WILL BE MADE BY CONTRACTOR/OWNER IN THE FIELD TO REDUCE STORM WATER RUNOFF AS NEEDED. SHOULD THE MEASURES SHOWN HEREON BE INSUFFICIENT TO REDUCE RUNOFF, THE CONTRACTOR/OWNER SHALL BE RESPONSIBLE FOR FIELD ADJUSTMENT TO BE MORE EFFECTIVE FOR RUNOFF.
4. UPON ADJUSTING AND/OR ALTERING SORM WATER POLLUTION PREVENTION MEASURES ONSITE, THE CONTRACTOR/OWNER SHALL BE RESPONSIBLE FOR UPDATING AND REVISING SITE MAP IN A TIMELY MANNER.
5. SHOULD TCEQ OR AN AUTHORIZED AGENCY OF, MODIFY STORM WATER REGULATIONS PRIOR TO THE COMPLETION OF CONSTRUCTION, THE CONTRACTOR/OWNER SHALL BE RESPONSIBLE FOR MAKING NECESSARY MODIFICATIONS TO THE RUNOFF REDUCTION MEASURES IN PLACE IN ORDER TO COMPLY WITH THE MOST CURRENT REGULATIONS.
6. PERIMETER CONTROL MEASURES WILL BE MAINTAINED DURING CONSTRUCTION AND UNTIL THE SITE HAS ACHIEVED 70% NATIVE BACKGROUND VEGETATION.
7. 70% STABILIZATION MAY INCLUDE PAVEMENT AND/OR THE ESTABLISHED LANDSCAPING THAT WILL PREVENT STORM WATER RUNOFF FROM ERODING OR COMPROMISING THE SITE AND DOWNSTREAM DRAINAGE FACILITIES.
8. UPON FINAL STABILIZATION, THE CONTRACTOR/OWNER IS RESPONSIBLE FOR REMOVING TEMPORARY EROSION CONTROL STRUCTURES.

ROCK CHECK DAM NOTES:

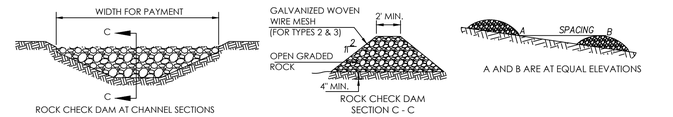
1. RIPRAP SIZE FOR ROCK CHECK DAM AND CONCRETE WASHOUT TO BE 4" - 8" CALICHE COURSE AGGREGATE.
2. CHECK DAMS MAY BE USED IN SLOPING DITCHES OR CHANNELS TO SLOW VELOCITY OR TO CREATE SEDIMENT TRAPS.
3. ENSURE THAT THE MAXIMUM SPACING BETWEEN DAMS PLACES THE TOE OF THE UPSTREAM DAM AT THE SAME ELEVATION AS THE DOWNSTREAM DAM.

SILT FENCING NOTES:

1. STEEL POST OR STAKES WHICH SUPPORT THE FENCE OR WADDELS SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE.
2. POST/STAKES MUST BE IMBEDDED 12". THE TOE OF THE BARRIER SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW.
3. SILT FENCE/WADDELS SHALL BE SECURELY FASTENED TO EACH STEEL POST OR STAKE, OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POST.
4. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. SILT FENCE/WADDEL SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE. ACCUMULATED SILT OR DEBRIS SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 6".
6. THE SILT OR DEBRIS SHALL BE DISPOSED OF IN AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITONAL SILTATION.

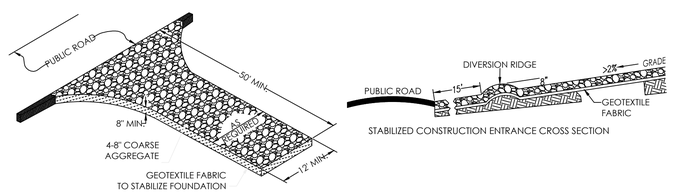
CONSTRUCTION ENTRANCE NOTES:

1. CONSTRUCTION ENTRANCE TO BE AN 8" MINIMUM DEPTH COARSE AGGREGATE OVER GEOTEXTILE FILTER FABRIC. RIPRAP SIZE TO BE 4" - 8".
2. A CHAIN-ANCHORED 4" STEEL PIPE SHALL BE PLACED WITHIN THE AGGREGATE AT THE ENTRANCE TO THE CONSTRUCTION SITE.



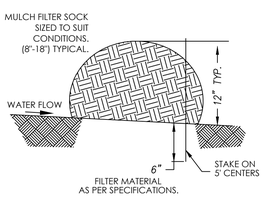
01 Rock Check Dam Details

SCALE: NTS



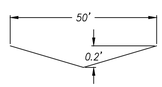
02 Typ. Construction Entrance

SCALE: NTS



03 Mulch Filter Sock Detail

SCALE: NTS



04 Interceptor Swale

SCALE: NTS

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WICHITA FALLS, TX

HS + HS QUAD DEVELOPMENT PLANS

Date: 12.21.17
Revisions: 1.16.18
3.6.18

Scale: 1"=10'-0"

SWPPP

Sheet No.

L-2.1

DEMOLITION NOTES:

1. PRIOR TO ANY DEMOLITION, GENERAL CONTRACTOR TO CONTACT ALL EXISTING UTILITY COMPANIES TO LOCATE ALL UTILITIES BY AUTHORIZED PERSONNEL OF UTILITY COMPANIES.
2. PRIOR TO ANY ABONDONMENT OF EXISTING UTILIIES, GENERAL CONTRACTOR SHALL CONTACT AUTHORIZED PERSONNEL OF UTILITY COMPANIES FOR COORDINATION AND LOCATION OF UTILITY ABONDONMENT.
3. ALL EXISTING UTILITIES TO BE ABONDONED MAY BE, AT THE DISCRETION OF THE GENERAL CONTRACTOR, COMPLETELY REMOVED OR HAVE PORTIONS REMOVED TO FACILITATE THE INSTALLATION OF NEW UTILITIES. ANY ABONDONED UTILITIES WHICH ARE CUT SHALL BE PERMANENTLY PLUGGED AND CAPPED PER UTILITY COMPANY REQUIREMENTS.
4. IF AN UNMAPPED UTILITY IS LOCATED, THE GENERAL CONTRACTOR SHALL CONTACT MSU SYSTEM CONSTRUCTION MANAGER TO DETERMINE IF IT WILL BE REMOVED OR ABANDONED IN PLACE.
5. GENERAL CONTRACTOR SHALL COORDINATE THE REMOVAL OF ALL WATER LINES WITH MSU.
6. GENERAL CONTRACTOR SHALL RETURN ALL REMOVED LIGHT STANDARDS TO MSU. CONTRACTOR SHALL ALSO PROVIDE INFORMATION ABOUT THE SIZE AND GEOMETRIC PATTERN OF THE ANCHOR BOLTS REMOVED.
7. GENERAL CONTRACTOR SHALL RETURN ALL STOP SIGNS AND POLES TO MSU.

KEY NOTES:

1. REMOVE EXISTING CONCRETE. BRING IN NEW BACKFILL AS NEEDED. SAW CUT WHERE REMOVING SECTIONS OF CONCRETE ADJACENT TO CONCRETE THAT WILL REMAIN.
2. EXISTING TUNNEL HATCH STRUCTURE TO REMAIN. PROTECT AND KEEP OPEN DURING CONSTRUCTION.
3. EXISTING TREES TO BE REMOVED.
4. EXISTING TREES OR SHRUBS TO BE PRESERVED IN PLACE. SEE TREE PRESERVATION DETAIL.
5. EXISTING CONCRETE SIDEWALK TO REMAIN. SAW CUT AND PROTECT.
6. EXISTING ASPHALT TO BE REMOVED. BRING IN CLEAN FILL AS NEEDED TO ACHIEVE FINAL GRADE. SAW CUT WHERE NEW ASPHALT WILL BE INSTALLED ADJACENT TO EXISTING ASPHALT.
7. EXISTING SIGN OR SITE MISC TO BE REMOVED. ALL SIGNAGE SHOULD BE TURNED OVER TO MSU MAINTENANCE.
8. EXISTING TIME CAPSULE. DO NOT DISTURB.
9. REMOVE EXISTING PLAQUE AND STORE DURING CONSTRUCTION. CONTRACTOR TO REINSTALL AFTER COMPLETION.
10. CONSTRUCTION PROJECT LIMITS.

REMOVE EXISTING CONCRETE

REMOVE EXISTING SOIL TO BRING TO GRADE

CONCRETE WALK

BRIDWELL HALL

CADDO TRAIL

THIS PORTION OF CADDO TRAIL AND THE SIDEWALKS TO THE NORTH AND SOUTH HAVE ALREADY BEEN REMOVED BY HS+HS BUILDING CONTRACTOR.

VAULT

PLAQUE

SV

BRICK SIGN

CONC. WITH PICNIC TABLE

24" JUNIPER TREE

TIME CAPSULE

4'-5"

26'

REMOVE WIDTH REQUIRED FOR PLAZA

CONCRETE WALK

THIS PORTION OF CONCRETE FLUME TO BE REMOVED UNDER HS+HS BUILDING CONTRACT BY THAT GENERAL CONTRACTOR

MCCOY ENGINEERING HALL

972.68 972.66 972.56 973.19 972.98 973.12 973.16

01 Demolition Plan
SCALE: 1" = 10'-0"

0 5 10 20

STANDARD BLADE WIDTH OR M. 1/4"

SAW-CUT LINE AS LOCATED

EXISTING CONCRETE TO REMAIN & PROTECT

EXISTING CONCRETE TO BE REMOVED

01 Saw Cut Detail
SCALE: NTS

NOTES:
1- SEE SPECIFICATIONS FOR ADDITIONAL TREE PROTECTION REQUIREMENTS.

2- IF THERE IS NO EXISTING IRRIGATION, SEE SPECIFICATIONS FOR WATERING REQUIREMENTS.

3- NO PRUNING SHALL BE PERFORMED EXCEPT BY APPROVED ARBORIST.

4- NO EQUIPMENT SHALL OPERATE INSIDE THE PROTECTIVE FENCING INCLUDING DURING FENCE INSTALLATION AND REMOVAL.

CROWN DRIP LINE OR OTHER LIMIT OF TREE PROTECTION AREA. SEE TREE PRESERVATION PLAN FOR FENCE ALIGNMENT.

TREE PROTECTION FENCE: HIGH DENSITY POLYETHYLENE FENCING WITH 3.5" X 1.5" OPENINGS; COLOR-ORANGE. STEEL POSTS INSTALLED AT 8' O.C.

2" X 6' STEEL POSTS OR APPROVED EQUAL.

MAINTAIN EXISTING GRADE WITH THE TREE PROTECTION FENCE UNLESS OTHERWISE INDICATED ON THE PLANS.

4'-0"

02 Tree Protection Detail
SCALE: NTS

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Revisions: 1.16.18
3.6.18

Scale: 1"=10'-0"

Demolition Plan

Sheet No.

L-2.2

MAN-Civil-KDC-Xrefs\HS 11/20/2014 1:56 PM KDC SHEARSHEET\L1\TEBLOCK.dwg

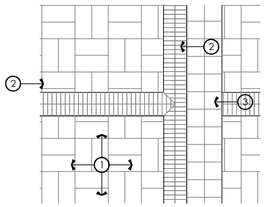
BRIDWELL HALL

DILLARD COLLEGE OF BUSINESS

FOR INFORMATION REGARDING THE FOUNTAIN SEE SHEET L-3.3

KEY NOTES:

1. PAVER WALKWAY WITH BELGARD OR PAVESTONE 80MM 4" X 8" HOLLAND PAVER (#219) IN A BASKET WEAVE PATTERN AS SHOWN. COLOR: ANTIQUE TERRA COTTA; CONTRACTOR TO SUBMIT SAMPLES. (13 L-6.0)
2. DOUBLE ROWLOCK PAVER BORDER USING 4" X 8" BELGARD OR PAVESTONE HOLLAND 80MM PAVER (#219). COLOR: CHARCOAL; CONTRACTOR TO SUBMIT SAMPLES. (13 L-6.0)
3. DOUBLE PAVER BORDER 12"X12" BELGARD OR PAVESTONE HOLLAND 80MM PAVER (#219). COLOR: PEWTER; CONTRACTOR TO SUBMIT SAMPLES. (13 L-6.0)
4. NEW 3,000 PSI CONCRETE WITH MEDIUM BROOM FINISH. SEE DIMENSION PLAN AND DETAILS FOR WIDTH AND JOINT SPACING. (8-9 L-6.0)
5. 4" COMPACTED STABILIZED DECOMPOSED GRANITE TREATED WITH SOIL-LOC AS SPECIFIED. (3 L-4.0)
6. PLANTERS FILLED WITH 3" DEPTH 1/2" SCREENED DECOMPOSED GRANITE (4 L-4.0)
7. NEW LAYDOWN CURB WITH 6" CURB AND 12" GUTTER (6 L-6.0)
8. NEW CONCRETE DROP-OFF (6-7 L-6.0)
9. NEW AREA LIGHT. SEE DETAILS AND SPECIFICATIONS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (7 L-6.1)
10. NEW EMERGENCY CALL BOX. SEE DETAILS AND SPECIFICATIONS. (1-3 L-6.0)
11. NEW PICNIC TABLE. SEE DETAILS AND SPECIFICATIONS. (8 L-6.1)
12. NEW BICYCLE RACK. SEE DETAILS AND SPECIFICATIONS. (5 L-6.1)
13. NEW TRASH RECEPTACLE. SEE DETAILS AND SPECIFICATIONS. (4 L-6.1)
14. NEW DROP-OFF AREA SIGNAGE. SEE DETAILS AND SPECIFICATIONS. (1-4 L-6.0)
15. NATIVE LIMESTONE DECORATIVE BOULDER.
16. 6" WIDE CONCRETE CURB. (9 L-6.0)
17. BRONZE MUSTANG SCULPTURES.
18. EXISTING TUNNEL HATCH WITH NEW BENCH SURROUND. SEE DETAILS AND SPECIFICATIONS. (4-1 L-6.1)
19. EXISTING CONCRETE TO REMAIN AND PROTECT.
20. TIE NEW CONCRETE INTO EXISTING CONCRETE. (10 L-6.0)
21. NEW STANDARD BENCH. SEE DETAILS AND SPECIFICATIONS. (6 L-6.1)



01 Paving Detail
SCALE: 1/4" = 1'-0"

01 Hardscape Plan
SCALE: 1" = 10'-0"

0 5 10 20

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Hardscape Plan

Sheet No.

L-3.0

BRIDWELL HALL

EXISTING SIDEWALK

USE 10' X 10' GRID TO LAYOUT FEATURES IN POND AREA. POND SIZE AND BASIC SHAPE MAY CHANGE BASED ON PENDING FEEDBACK INFORMATION FROM COMMISSIONED ARTST.

MEET EXISTING SIDEWALK FLUSH AND AT A 90° ANGLE

MCCOY ENGINEERING HALL

DILLARD COLLEGE OF BUSINESS

EXISTING CONCRETE

EXISTING CONCRETE

EXISTING CONCRETE

01 Dimension Plan

SCALE: 1" = 10'-0"

0 5 10 20

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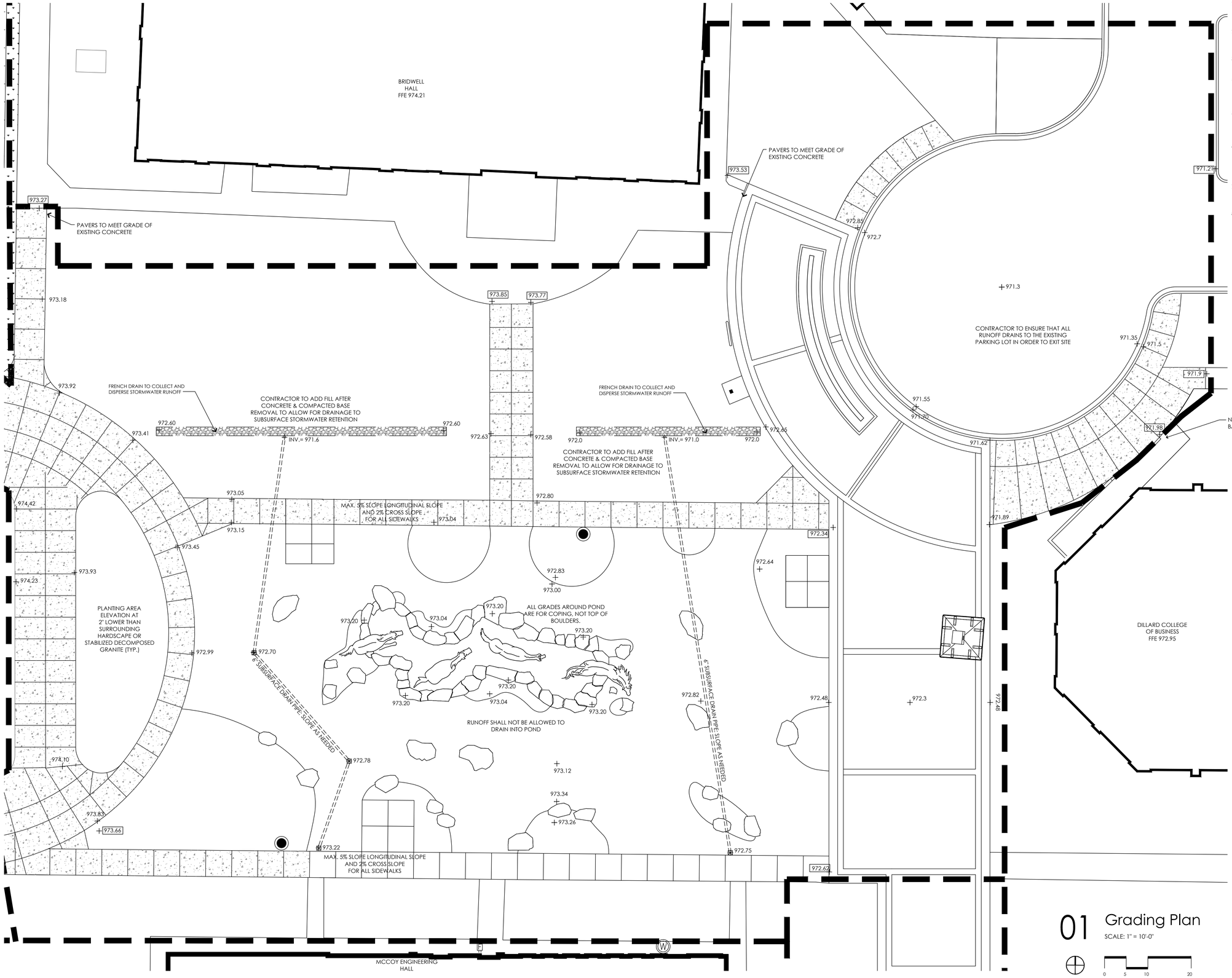
Dimension Plan

Sheet No.

L-3.1

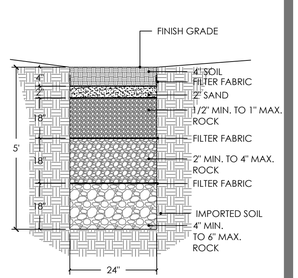


GENERAL NOTES AND CONDITIONS:

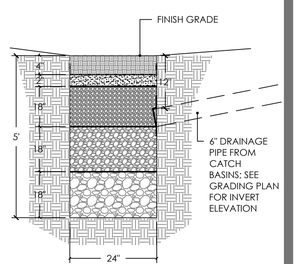
1. ALL GRADING INFORMATION SHOWN IS CONCEPTUAL AT THIS TIME. CONTRACTOR TO USE THE GRADE ARROWS AS DIRECTION THAT RUNOFF SHOULD FLOW.
2. CONTRACTOR TO GRADE SITE SO THAT WATER DOES NOT STAND OR POOL IN AREAS WHERE PEDESTRIAN OR VEHICULAR TRAFFIC IS PREVALENT.
3. MAJORITY OF QUAD TO DRAIN TO SUBSURFACE FRENCH DRAIN SHOWN ON PLAN.
4. ALL FINISHED GRADES SHALL PROVIDE FOR NATURAL RUNOFF OF WATER WITHOUT LOW SPOTS OR POCKETS. UNLESS SPECIFICALLY DRAWN AND DETAILED, ALL FLOW SHALL BE AWAY FROM ALL STRUCTURES.
5. HOLD FINISHED GRADES FOR PLANTING LAWN AREAS 1.5" BELOW TOP OF ADJACENT PAVEMENT. ALL FINISHED GRADES FOR PLANTING BEDS SHALL BE HELD AT 2" BELOW TOP OF ADJACENT PAVEMENT.
6. GRADUALLY ROUND OFF TOPS AND TOES OF ALL PLANTED SLOPES TO PRODUCE A SMOOTH ARCHITECTURAL TRANSITION BETWEEN RELATIVELY LEVEL AREAS AND SLOPES, UNLESS SPECIFICALLY DETAILED IN THE LANDSCAPE GRADING DETAILS.
7. RUNOFF FROM DROP OFF PAVERS AND CONCRETE CIRCLE DROP OFF TO DRAIN TO THE NORTHEAST THROUGH THE PARKING LOT.
8. UNLESS OTHERWISE INDICATED, WALKS SHALL NOT EXCEED 5% LONGITUDINAL SLOPE AND 2% CROSS SLOPE. SHOULD A SECTION OF WALK WORK OUT THAT WAY IN THE FIELD, MSU CONSTRUCTION MANAGER AND LANDSCAPE ARCHITECT SHOULD BE CONSULTED WITH A SOLUTION BY THE CONTRACTOR.

+ 973.12 PROPOSED SPOT ELEVATIONS

971.9 + EXISTING SPOT ELEVATIONS



01 French Drain Detail
SCALE: NTS



02 Drain Pipe Inlet
SCALE: NTS

01 Grading Plan
SCALE: 1" = 10'-0"

0 5 10 20

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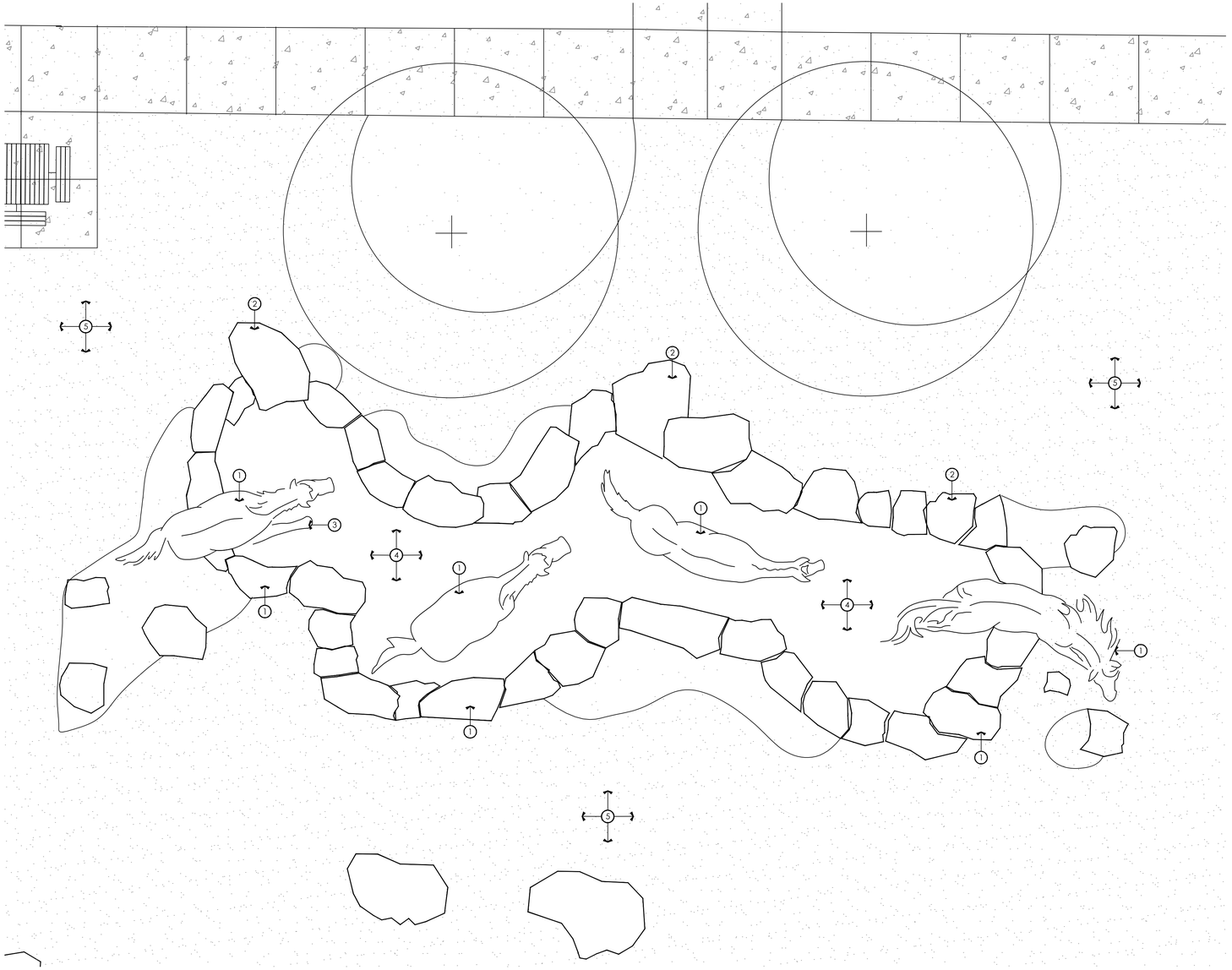
Dimension Plan

Sheet No.

L-3.2



01 Fountain Plan

SCALE: 1/4" = 1'-0"

0 2 4 8

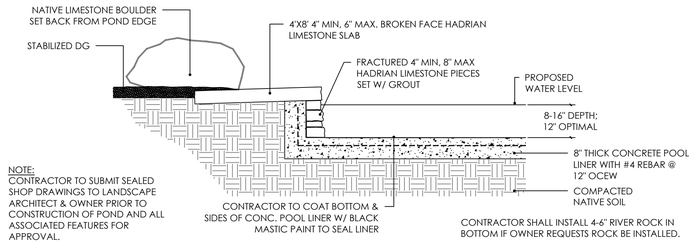
NOTES:
FOUR HORSE SCULPTURES WILL BE INSTALLED AS PART OF THIS PHASE. THE BRONZE SCULPTURES ARE BY OTHERS. CONTRACTOR SELECTED FOR INSTALLATION WILL BE REQUIRED TO COORDINATE HEAVILY WITH ARTIST ON LOCATION OF AND INSTALLATION METHODS FOR SECURING SCULPTURES. POND SIZE AND SHAPE IS SCHEMATIC AND MAY BE ADJUSTED BY OWNER, ARTIST AND/OR LANDSCAPE ARCHITECT TO BEST SUIT SCULPTURE LOCATIONS, ETC.

FOUNTAIN KEY NOTES:

1. BRONZE MUSTANG SCULPTURES BY OTHERS
2. LARGE DECORATIVE LIMESTONE BOULDERS CREATING POND BORDER
3. GREENSCAPE PUMP NOZZLES INSTALLED UNDER SCULPTURE HOOFS (ONE NOZZLE UNDER EACH HOOF THAT IS IN WATER; LOCATIONS TBD)
4. FOUNTAIN BASIN (SIZE MAY BE ALTERED IN FIELD BASED ON FEEDBACK FROM ARTIST)
5. 4" STABILIZED DECOMPOSED GRANITE
6. SUBMERSIBLE LED LIGHT FIXTURE BY GREENSCAPE PUMP.
7. POND FOG SYSTEM
8. SQUARE ANTI-VORTEX PLATE AND SUMP ASSEMBLY (NOT SHOWN ON PLANS)
9. FLOOR DRAIN (NOT SHOWN ONPLANS)
10. SIDEWALL OVERFLOW DRAIN WITH BRONZE BODY (NOT SHOWN ON PLANS)
11. WALL MOUNTED OVERFLOW/WATER CUT-OFF CONTROL (NOT SHOWN ON PLANS)
12. ANTI-VORTEX PLATE AND SUMP ASSEMBLY (NOT SHOWN ON PLANS)
13. FRONT ACCESS SURFACE SKIMMER W/ WATERSTOP (NOT SHOWN ON PLANS)
14. SUBMERSIBLE JUNCTION BOX (NOT SHOWN ON PLANS)
15. SPECIAL SERIES 2 DIRECT BURIAL 4' X 4'-6" X 3'-2" FOG VAULT (NOT SHOWN ON PLANS)
16. DIRECT BURIAL 6'-4" X 5'-10" X 8' PUMP VAULT (NOT SHOWN ON PLANS)
17. SUPPORTS TO HOLD SCULPTURES UNDER EACH HOOF AT WATER LEVEL. DESIGN & LOCATIONS TO BE COORDINATED WITH ARTIST.
18. CONTRACTOR TO SUBMIT SHOP DRAWINGS PROVIDED BY GREENSCAPE PUMP FOR APPROVAL
19. PLANTER AT POND EDGE: SEE PLANTING PLAN

FOUNTAIN NOTES:

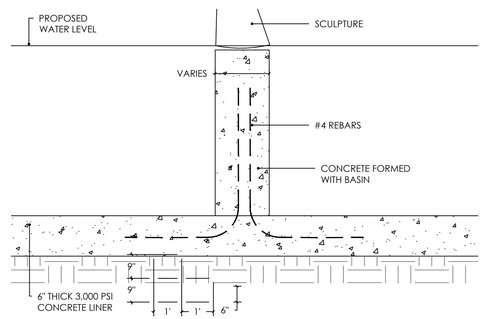
1. FINAL SHAPE AND SIZE OF MUSTANG FOUNTAIN POND TO BE DETERMINED BASED ON SIZE, LOCATION AND ORIENTATION OF BRONZE MUSTANGE SCULPTURES. SHAPE AND SIZE SHOWN IS PRELIMINARY FOR BIDDING PURPOSES.
2. CONTRACTOR IS TO CONTACT MICHAEL WEBB AT GREENSCAPE PUMPS AT 972.446.0037 TO GET SEALED ENGINEER DRAWINGS FOR ALL COMPONENTS LISTED AND ALL REQUIRED FOR THE PROPER FUNCTIONING OF THE FOUNTAIN AND FOG SYSTEM. DRAWINGS SHALL BE SUBMITTED TO LANDSCAPE ARCHITECT AND MSU CONSTRUCTION MANAGER FOR REVIEW.
3. ONCE DRAWINGS HAVE BEEN APPROVED, GENERAL CONTRACTOR SHALL COORDINATE INSTALLATION WITH GREENSCAPE PUMPS, SCULPTURE ARTIST, LANDSCAPE ARCHITECT AND MSU CONSTRUCTION MANAGER TO ENSURE DESIGN INTENT IS MET WITH THE INSTALLATION AND FINAL APPEARANCE OF WATER FEATURES.



NOTE:
CONTRACTOR TO SUBMIT SEALED SHOP DRAWINGS TO LANDSCAPE ARCHITECT & OWNER PRIOR TO CONSTRUCTION OF POND AND ALL ASSOCIATED FEATURES FOR APPROVAL.

01 Fountain Cross-Section Detail

SCALE: NTS



02 Sculpture Support

SCALE: NTS

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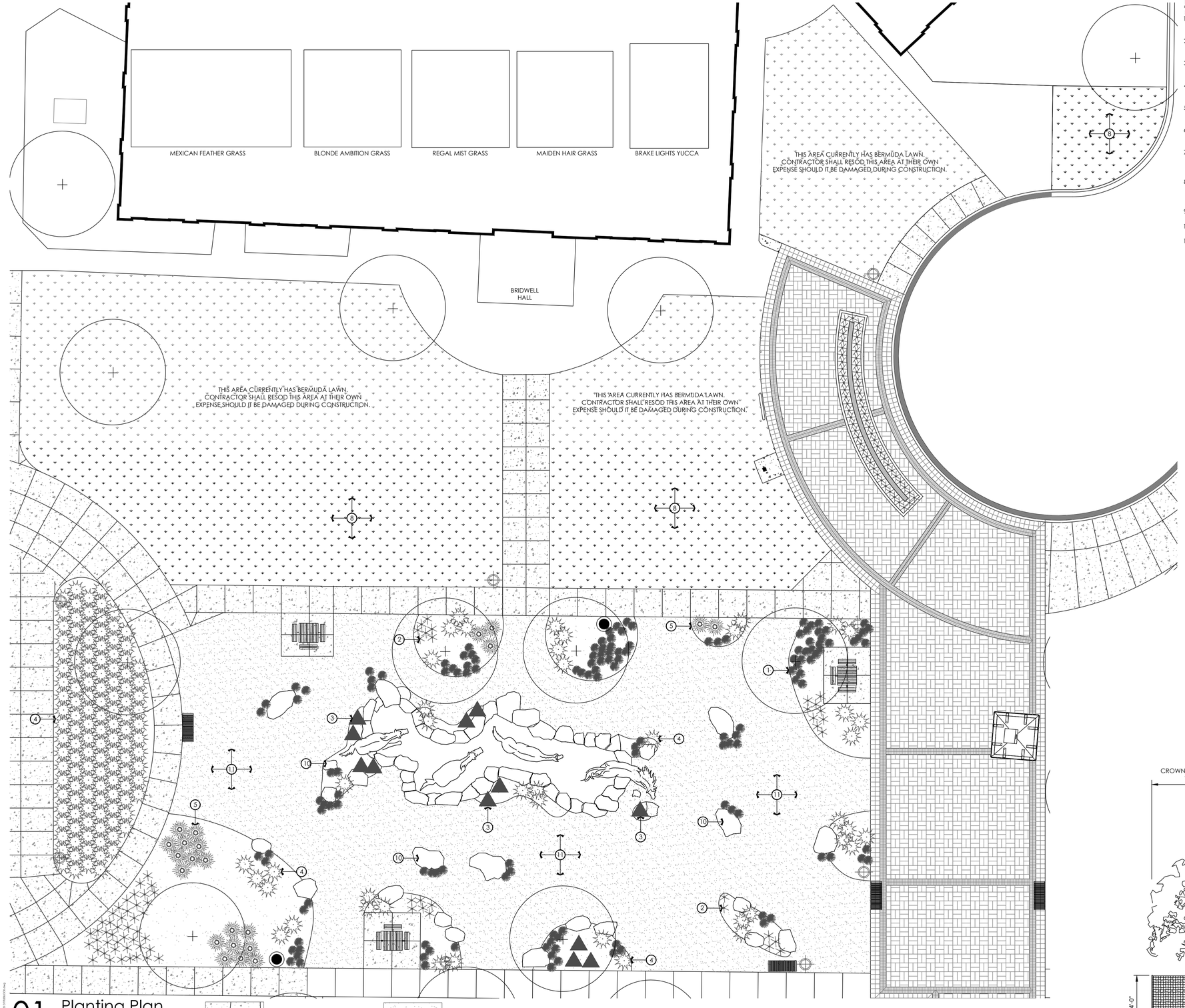
Scale: 1/4"=1'-0"

Fountain Plans

Sheet No.

L-3.3



01 Planting Plan

SCALE: 1" = 10'-0"

0 5 10 20

PROPOSED CONCRETE

PROPOSED TURF

PROPOSED STABILIZED DG

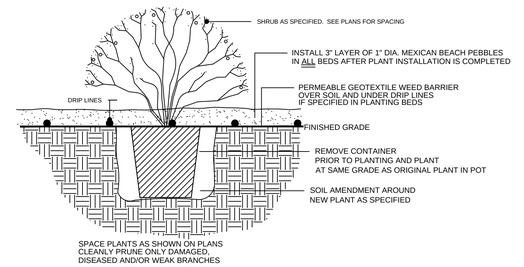
PROPOSED DECOMPOSED GRANITE

PROPOSED PAVER PLAZA

LANDSCAPE KEY NOTES:

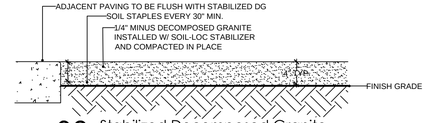
PROVIDE PHOTOGRAPH SUBMITTALS OF ALL TREE MATERIAL

1. STIPA TENUISSIMA - MEXICAN FEATHER GRASS (142); 1 GAL CONTAINER GROWN; 8" TALL X 6" WIDE WITH VERY FULL TOP AND HEAVILY ROOTED. SPACED AT 24" O.C.
2. BOUTELOUA GRACILLIS - BLOND AMBITION BLUE GRAMAGRASS (132); 1 GAL CONTAINER GROWN; 8" TALL X 12" WIDE; VERY FULL. SPACED AT 24" O.C.
3. MUHLENBERGIA CAPILLARIS 'REGAL MIST' - REGAL MIST PINK MUHLY GRASS (11); 5 GAL CONTAINER GROWN; 18" TALL X 16" WIDE; FULL TOP. SPACED AT 36" O.C.
4. MISCANTHUS SINENSIS 'GRACILLIMUS' - MAIDEN HAIR GRASS (168); 5 GAL CONTAINER GROWN; 18" TALL X 16" WIDE; FULL TOP. SPACED AT 36" O.C.
5. HESPERALOE PARVIFLORA 'PERPA' BRAKELIGHTS - "BRAKELIGHTS" RED YUCCA (22); 5 GAL CONTAINER GROWN; 16" TALL X 16" WIDE WITH VERY FULL TOP.
6. 3/4" DIA. SCREENED DECOMPOSED GRANITE IN ALL BED AREAS. INSTALL OVER NON-WOVEN PERMEABLE GEOTEXTILE FABRIC TO MIN. 3" DEEP. PROVIDE SUBMITTALS AND REFER TO SPECS.
7. ALL PLANTING BEDS SHALL BE EXCAVATED TO A MINIMUM OF 18" DEEP AND NEW SANDY LOAM TOPSOIL AND PLANTING MIX AS PER SPECIFICATIONS SHALL BE BROUGHT IN SO THAT SETTLED BED HEIGHT SHALL BE 2" BELOW ADJACENT PAVEMENT.
8. SODDED CYNODON DACTYLON 'CELEBRATION'; HAND RAKE TO WITHIN 1" PER 10' TO ELIMINATE ALL "DISHING" OF SOILS. ROLL WITH HEAVY ROLLER AFTER INSTALLATION. ONLY PREMIUM QUALITY CUT SOD WITH MIN. 1" SOLID BASE WILL BE ACCEPTABLE.
9. PROTECT AND DO NOT DISTURB ALL EXISTING TREES ON SITE.
10. VARYING SIZE LIMESTONE BOULDERS RANGING IN SIZE FROM 2' X 2' TO 5' X 4'.
11. STABILIZED DECOMPOSE GRANITE. CONTRACTOR SHALL USE 1/4" MINUS AGGREGATE COMPACTED TO 4" MIN AND TREATED WITH SOIL-LOC PER MANUFACTURER'S SPECIFICATIONS.



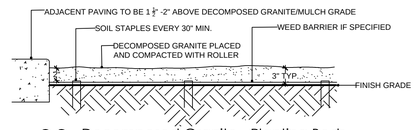
01 Shrub Detail

SCALE: NTS



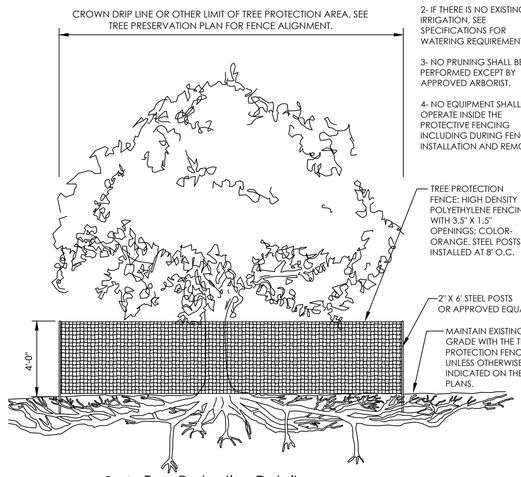
02 Stabilized Decomposed Granite

SCALE: NTS



03 Decomposed Granite - Planting Beds

SCALE: NTS



04 Tree Protection Detail

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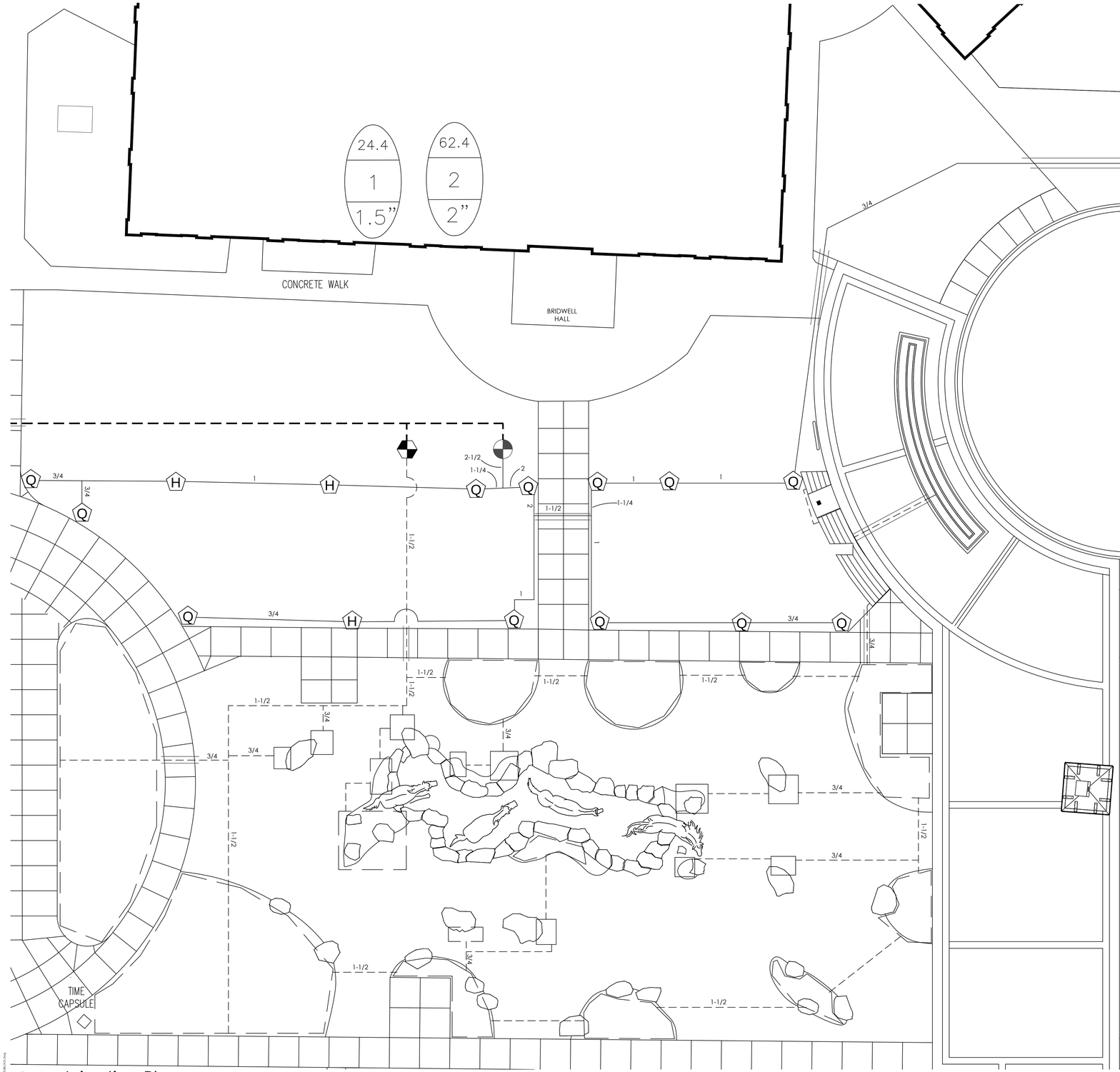
Planting Plan

Sheet No.

L-4.0



01 Irrigation Plan

SCALE: 1" = 10'-0"

0 5 10 20

IRRIGATION NOTES:

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW PLANS, SPECIFICATIONS AND THE CONSTRUCTION SITE TO BECOME FAMILIAR WITH THE PROJECT. CONTRACTOR IS TO CONTACT APPROPRIATE AUTHORITIES FOR LOCATING ALL UTILITIES PRIOR TO CONSTRUCTION. NOTIFY ONE-CALL AT 811 OR AT THE WEB SITE WWW.DIGTESS.ORG. PLANS AND SPECIFICATION WILL BE STRICTLY ADHERED TO. DURING INSTALLATION ROUTINE INSPECTION FOR COMPLIANCE WILL TAKE PLACE. NONCONFORMING WORK WILL BE REMOVED AND CORRECTED TO THE OWNER'S SATISFACTION.

2. IT IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLY WITH CITY, STATE AND LOCAL ORDINANCES, RULES, CODES AND PERMITTING PERTAINING TO THIS WORK. AS PER TCEQ REQUIREMENTS, A LICENSED IRRIGATOR OR AN IRRIGATION TECHNICIAN MUST BE ON-SITE DURING THE INSTALLATION OF THE IRRIGATION SYSTEM. LICENSED IRRIGATOR(S) WILL SUPERVISE AN IRRIGATION TECHNICIAN WHEN CONNECTING AN IRRIGATION SYSTEM TO A WATER SUPPLY OR INSTALLING, MAINTAINING, ALTERING, REPAIRING, OR SERVICING AN IRRIGATION SYSTEM, AND/OR SUPERVISE AN INSTALLER CONNECTING AN IRRIGATION SYSTEM TO A WATER SUPPLY.

3. VERIFY STATIC PRESSURE TO BE SUFFICIENT FOR SYSTEM PERFORMANCE. NOTIFY IRRIGATION DESIGNER IF PRESSURE IS LESS THAN REQUIRED BY THE DESIGN.

4. POINT OF CONNECTION WILL BE EXISTING 4" WATER LINE FROM HS+HS BUILDING AS SHOWN.

5. IRRIGATION DRAWING IS A SCHEMATIC REPRESENTATION. ALL MAINLINE TIE-IN LOCATIONS AND LATERAL PIPING TO BE LOCATED IN PLANTING AREAS. WHERE PIPE MUST PASS BENEATH FLATWORK AND ROADWAYS, SLEEVES ARE TO BE PROVIDED AND STUBBED-UP AS DETAILED. ANY PIPE, HEADS, COMPONENTS, ETC SHOWN IN ASPHALT OR CONCRETE ARE SHOWN FOR CLARITY ONLY.

6. DRIP ZONE VALVES TO BE PRECEDED BY A LINE SIZED SPEARS SCHEDULE 80 ISOLATION VALVE. ALL ZONE VALVES TO BE INSTALLED IN RECTANGULAR VALVE BOXES AS NOTED. IT IS DESIRABLE TO INSTALL MULTIPLE VALVES IN A SINGLE VALVE BOX OF ADEQUATE SIZE ALLOWING FOR FUTURE ACCESS. A VALVE TAG WILL BE SECURED TO THE VALVE BOX LID, CHRISTY ID TAG OR EQUAL.

7. CONTROLLER IS EXISTING HUNTER CONTROLLER AT HS+HS BUILDING. ALL LOW VOLTAGE WIRING TO BE SIZED AS NEEDED UF DIRECT BURY WIRE. WIRE CONNECTIONS TO BE MADE WITH DBYR 600V WATER PROOF CONNECTORS AT ALL SPLICES. PROVIDE A WIRE LOOP IN VALVE BOXES THAT WILL EXTEND A MINIMUM OF 36" ABOVE GRADE FOR ALL CONNECTIONS AND FUTURE CONNECTIONS. SEAL ALL LOOSE WIRE ENDS WITH SPECIFIED CONNECTORS. DBYR CONNECTORS ARE INTENDED FOR ONE TIME USE ONLY. SHOULD IT BE NECESSARY TO DISCONNECT A SPLICE, DISCARD CONNECTOR AND REPLACE WITH A NEW CONNECTOR. INSTALL WIRING BENEATH PIPE IN TRENCHES. TAPE WIRE TO THE UNDERSIDE OF THE MAINLINE ON 15' INTERVALS. WHERE WIRE MUST BE INSTALLED SEPARATE FROM THE MAINLINE INSTALL IN A 1" SCH 40 GRAY ELECTRICAL CONDUIT. FIELD SPLICES ARE DISCOURAGED OTHER THAN AT VALVES BUT WHERE THEY ARE UNAVOIDABLE AND PRE-APPROVED, INSTALL IN A 10" ROUND SPLICE BOX WITH A 36" ABOVE GRADE EXPANSION LOOP.

8. ALL MAINLINE PIPE DOWNSTREAM OF MAINLINE CONNECTIONS (EXCEPT WHERE NOTED ON THESE PLANS) AND LATERAL PIPE TO BE WHITE CLASS 200 PVC. ALL PIPE 3" AND SMALLER WILL BE SOLVENT WELD PIPE. SOLVENT WELD PVC PIPE AND FITTINGS PER MANUFACTURERS RECOMMENDATIONS. ALL PIPE AND FITTINGS TO BE PRIMED WITH PURPLE PRIMER WITHOUT EXCEPTION. FLOW VELOCITIES WILL GENERALLY DETERMINE PIPE SIZES. IN NO EVENT WILL THE FLOW VELOCITIES BE GREATER THAT 5 FPS. THE 5 FPS RULE IS SUPERSEDED BY ACTUAL PRESSURE LOSS CALCULATIONS. PRESSURE LOSS IN ANY ZONE WILL NOT BE GREATER THAN 10% OF THE RECOMMENDED OPERATING PRESSURE OF THE EMISSION DEVICE. PIPE SIZES WILL BE INCREASED TO COMPLY WITH THIS SPECIFICATION.

9. ALL SOLVENT WELD FITTINGS TO BE SCHEDULE 40. THREADED FITTINGS TO BE SCHEDULE 80. WHERE METAL FITTINGS OCCUR, ONLY SCHEDULE 80 MALE PVC THREADED INTO METAL FEMALE PIPE FITTINGS AND/OR GLASS-FILLED NYLON VALVES WILL BE ACCEPTED. CLOSE BY CLOSE SOLVENT WELDING OF FITTINGS WILL NOT BE ALLOWED. ALL FITTINGS WILL BE JOINED BY SUFFICIENT PIPE LENGTHS ALLOWING FUTURE REPAIRS AND/OR MODIFICATIONS.

10. SOLVENT WELD PIPE CONNECTION WILL BE MADE WITH APPROVED GLUE & PRIMER ONLY. PRIMER WITH PIGMENTATION WILL BE USED ON ALL SOLVENT WELD CONNECTIONS. WELD-ON P68 OR P70 PURPLE PRIMER. GLUE WILL BE WELD-ON 710 FOR PIPE UP TO 2", WELD-ON 705 OR 795 FOR PIPE UP TO 4". APPLY CEMENT TO PIPE SPIGOT FIRST, THEN TO FITTING TO AVOID EXCESS CEMENT BUILDUP INTERIOR TO FITTING AND PIPE. TWIST PIPE ¼ TURN, HOLD IN PLACE FOR 30 SECONDS AND WIPE EXCESS CEMENT FROM EXTERIOR SURFACES. GLUE AND CLEANER WILL BE SUBMITTAL ITEMS. SOLVENT WELDING OF PIPE IN WET CONDITIONS AND/OR IF THE OUTSIDE AMBIENT AIR TEMPERATURE FALLS BELOW THE MANUFACTURERS RECOMMENDED THRESHOLD, SHALL NOT OCCUR UNLESS DIRECTED BY THE IRRIGATION DESIGNER. FOR PROPER SOLVENT WELDING OF PIPE AND FITTINGS, CEMENT APPLICATOR MUST BE NO LESS THAN HALF THE SIZE OF THE PI

11. MAINLINE PIPING WILL BE FLUSHED PRIOR TO INSTALLING CONTROL VALVES. LATERAL PIPING WILL BE FLUSHED PRIOR TO INSTALLING NOZZLES. DRIP IRRIGATION WILL BE THOROUGHLY FLUSHED PRIOR TO INSTALLING FLUSH AND AIR RELIEF VALVES. WITH WATER RUNNING BEGIN CLOSEST TO THE ZONE VALVE INSTALLING NOZZLES OR DRIP FLUSH AND AIR VALVES. THE MOST DISTANT DEVICE ON THE ZONE WILL BE THE LAST DEVICE INSTALLED.

12. SEE DETAILS FOR REQUIRED PIPE AND VALVE DEPTHS. PIPE AND WIRING WILL BE INITIALLY COVERED WITH A 6" MINIMUM OF FINE MATERIAL FROM EXCAVATIONS. IMPORT FILL MATERIAL IF EXCAVATIONS ARE NOT SUITABLE FOR COVERING AND BACKFILLING OF ALL TRENCHES. ROCKS OR OTHER OBJECTS GREATER THAN 3/4" IN DIAMETER WILL NOT BE ALLOWED IN CONTACT WITH PIPE OR WIRING.

13. THE INTENT OF DRAWINGS IS TO PROVIDE 100% PLUS COVERAGE FOR ALL PLANT MATERIALS. SPRINKLER HEAD LOCATIONS MAY REQUIRE MODIFICATION DUE TO CHANGES IN THE SITE, DESIGN DEFICIENCIES, OR OTHER CHANGES UNFORESEEN AT THE TIME OF DESIGN. FINAL HEAD PLACEMENT AND COVERAGE WILL BE APPROVED BY THE IRRIGATION DESIGNER. CONTRACTOR IS RESPONSIBLE FOR ACHIEVING 100% COVERAGE OF THE IRRIGATION SYSTEM AS SHOWN ON THE FOLLOWING SHEETS. IF ALTERATIONS OR MODIFICATIONS ARE REQUIRED TO ACHIEVE 100% COVERAGE, IT SHALL BE BROUGHT TO THE ATTENTION OF, AND THE NEW LAYOUT STAKED, THE OWNER'S REPRESENTATIVE AND/OR THE IRRIGATION DESIGNER FOR APPROVAL.

14. A FINAL SCALED AS-BUILT DRAWING WILL BE FURNISHED UPON COMPLETION OF THE PROJECT AND PRIOR TO FINAL PAYMENT. ACCURATE RED LINE AS BUILDS WILL BE MAINTAINED IN THE CONSTRUCTION OFFICE UPDATED NO LESS THAN EVERY SEVEN DAYS. ITEMS TO DOCUMENT INCLUDE MAINLINE, TWO WIRE PATH DRAWN SCHEMATICALLY, VALVES, ISOLATION VALVES, FLOW SENSOR WIRE PATH, SPLICE BOXES AND ANY EQUIPMENT INCORPORATED INTO THE WORK THAT MAY NEED TO BE LOCATED AT A FUTURE TIME. EACH ITEM WILL HAVE TWO MEASUREMENTS FROM FIXED OBJECTS. OBJECTS WILL BE PERMANENT FEATURES AND WILL OCCUR AT DIFFERING ANGLES FROM THE DEVICE.

15. A COLORED ZONE MAP IDENTIFYING EACH ZONES WATERING EXTENTS, VALVE TYPE & STATION NUMBER (I.E. ZONE #1, ROTOR = R1, ETC.) TO BE COMPLETED ON A SHEET SEPARATE FROM THE IRRIGATION AS-BUILT. FURNISH A COMPLETE ZONE MAP UPON COMPLETION OF THE PROJECT AND PRIOR TO FINAL PAYMENT.

16. SUBMITTALS WILL BE REQUIRED FOR PRE-APPROVAL OF ALL MATERIALS TO BE INCORPORATED INTO THE IRRIGATION SYSTEM. IN THE EVENT THAT MORE THAN ONE PRODUCT MAY BE USED (I.E. PIPE AND FITTINGS), SUBMIT EACH FOR APPROVAL. MATERIALS NOT SUBMITTED AND APPROVED WILL BE REMOVED FROM THE SITE AT THE COST OF THE CONTRACTOR AND AT NO COST TO THE OWNER.

17. THE UNDERGROUND IRRIGATION SYSTEM SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP FOR ONE YEAR FOLLOWING FINAL ACCEPTANCE OF THE WORK.

18. CONTRACTOR TO STAKE HEAD LAYOUT AND GET APPROVAL FROM DESIGNER AND/OR OWNER'S REPRESENTATIVE PRIOR TO TRENCHING. IF NOT, CONTRACTOR IS RESPONSIBLE FOR ANY CORRECTIONS OR ALTERATIONS TO MATCH HEAD LAYOUT AND SPACING SHOWN ON PLANS AT CONTRACTOR'S EXPENSE.

IRRIGATION KEY

SYMBOL	DESCRIPTION	SPECIFIED TYPE	REMARKS
	SPRAY HEAD	HUNTER MP 2000 ON HUNTER PROS-04-CV BODY	FIELD ADJUST RADIUS AS NECESSARY; USE MAROON: 90° - 210°; LT. BLUE: 210° - 270°; OLIVE: 360°
	ROTOR HEAD	HUNTER 1-20; STEEL RISER	4.0 NOZZLE; STAINLESS STEEL RISER
	DRIP AREA: TURF	NETAFIM TECHLINE HCVXR NETAFIM	TECHLINE PRESSURE COMPENSATING LANDSCAPE DRIPLINE W/ CHECK VALVE, .77GPH EMITTERS @ 12" OC. LATERALS SPACED @ 12" APART, WITH EMITTERS OFFSET FOR TRIANGULAR PATTERN. 17MM, CONNECT HEADER TO NEAREST HEAD ON SAME ZONE.
	DRIP AREA: PLANTER	NETAFIM TECHLINE HCVXR NETAFIM	TECHLINE PRESSURE COMPENSATING LANDSCAPE DRIPLINE W/ CHECK VALVE, .77GPH EMITTERS @ 12" OC. LATERALS SPACED @ 18" APART, WITH EMITTERS OFFSET FOR TRIANGULAR PATTERN.
	HUNTER BRASS IBV VALVE	HUNTER IBV BRASS VALVE	HUNTER IBV BRASS VALVE; SIZE AS NOTED
	DRIP VALVE	HUNTER ICZ DRIP VALVE	INSTALL W/ ISOLATION VALVE, FILTER AND PRESSURE REGULATOR
	SLEEVES	PVC CL 200 SDR 21	TWICE SIZE OF THROUGH PIPE
	NEW 3" MAINLINE	PVC CL 200 SDR 21; GASKETED	CONNECT TO EX. 4" MAINLINE FROM HS+HS BUILDING
	NEW DRIP HEADER NEW LATERAL LINE AS SPECIFIED	CLASS 200 PVC SIZED AS SHOWN CLASS 200 PVC SIZED AS SHOWN	PRIME ALL JOINTS. JOINTS 2" AND OVER SHOULD BE SANDED. PRIME ALL JOINTS. JOINTS 2" AND OVER SHOULD BE SANDED.

60.6 — GPM OF ZONE
20 — VALVE NUMBER
2" — VALVE SIZE
VALVE ID TAG

KDC Associates
4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
Phone: 432.686.8001
Fax/Info: 432.683.3487
www.KDCassociates.com
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STATE OF TEXAS
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WICHITA FALLS, TX

HS + HS QUAD DEVELOPMENT PLANS

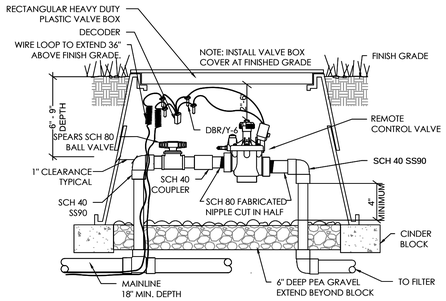
Date: 12.21.17
Revisions: 1.16.18
3.6.18

Scale: 1"=10'-0"

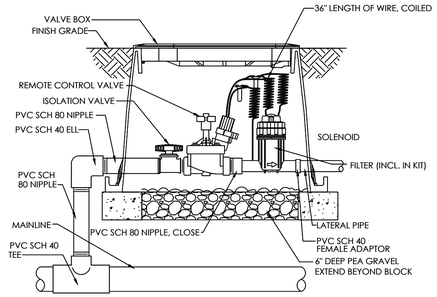
Irrigation Plan

Sheet No.

L-4.1



01 Valve Detail
SCALE: NTS



02 Drip Valve Assembly
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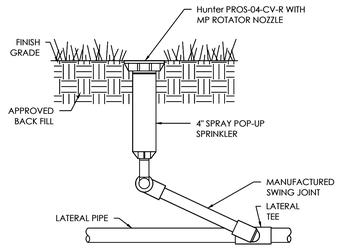

03 Spray Head Detail
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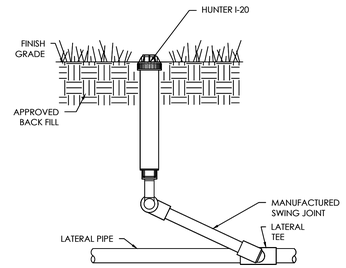

04 Rotor Detail
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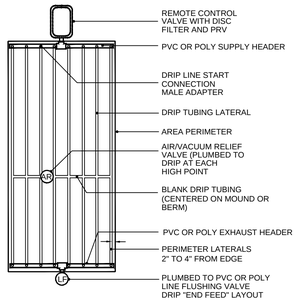

05 Drip Line Layout
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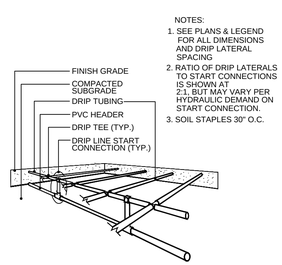

06 Drip Line Layout
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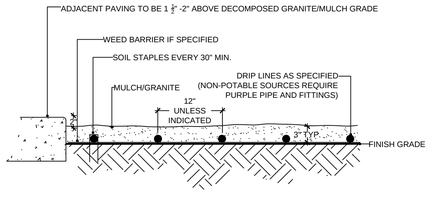

07 Drip Line Instal
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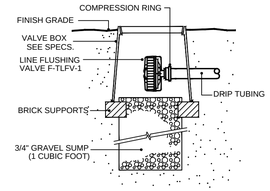

08 Air Relief Valve
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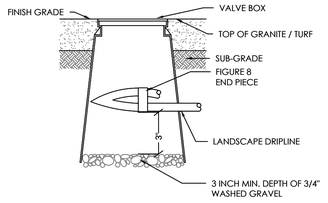
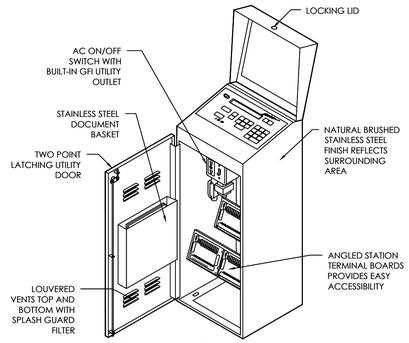
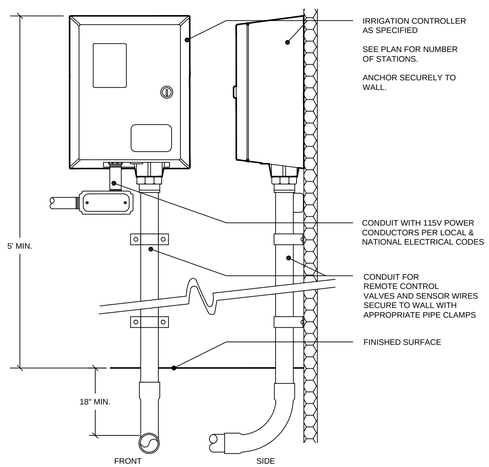


NOTE: INSTALL AT FARTHEST POINT OF DRIP ZONE, INSTALL AT EACH END POINT.

09 Drip Line Flushing End
SCALE: NTS



10 Steel Controller Cabinet
SCALE: NTS



11 Wall Controller Mounting
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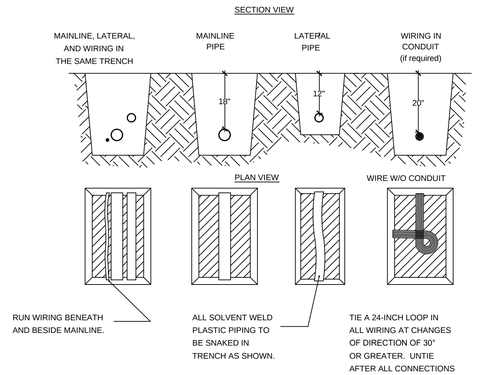

12 Trench Detail
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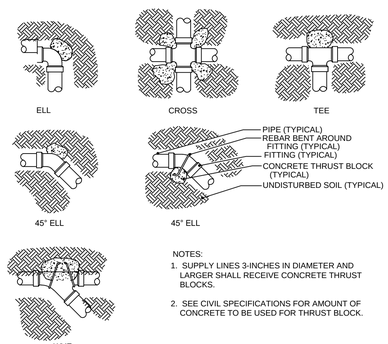
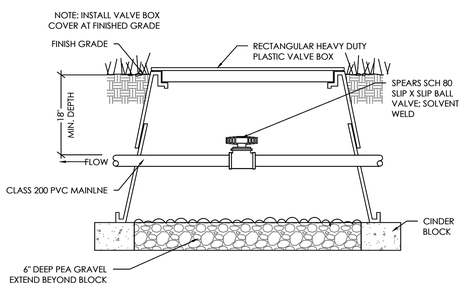
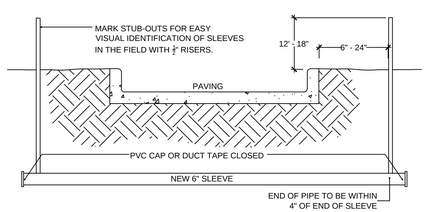


NOTES:
1. SUPPLY LINES 3-INCHES IN DIAMETER AND LARGER SHALL RECEIVE CONCRETE THRUST BLOCKS.
2. SEE CIVIL SPECIFICATIONS FOR AMOUNT OF CONCRETE TO BE USED FOR THRUST BLOCK.

13 Thrust Block Details
SCALE: NTS



14 Isolation Valve Detail
SCALE: NTS



15 Sleeve Detail
SCALE: NTS

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4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
Phone: 432.686.8001
Fax/Info: 432.683.3487
www.KDCassociates.com
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WICHITA FALLS, TX
HS+HS QUAD DEVELOPMENT PLANS

Date: 12.21.17
Revisions: 1.16.18
3.6.18

Scale: As Shown
Irrigation Details
Sheet No.
L-4.2

KEY NOTES:

1. TYP. NEW PICNIC TABLE. SEE DETAILS AND SPECS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (8 / L-6.1)
2. TYP. NEW AREA LIGHT. SEE DETAILS AND SPECS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (7 / L-6.1)
3. NEW EMERGENCY CALL BOX. SEE DETAILS AND SPECIFICATIONS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (1-3 / L-6.1)
4. NEW TRASH RECEPTACLE. SEE DETAILS AND SPECIFICATIONS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (4 / L-6.1)
5. TYP. BICYCLE RACK. SEE DETAILS AND SPECIFICATIONS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (5 / L-6.1)
6. TYP. BENCH. SEE DETAILS AND SPECIFICATIONS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (6 / L-6.1)

BRIDWELL HALL

CONCRETE WALK

PHASE PROJECT LIMITS

TIME CAPSULE

MCCOY ENGINEERING HALL

DILLARD COLLEGE OF BUSINESS

01 Amenities Plan

SCALE: 1" = 10'-0"

0 5 10 20

KDC Associates
4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
Phone: 432.684.8051
Fax/alt#: 432.683.3487
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HS + HS QUAD DEVELOPMENT PLANS

Date: 12.21.17
Revisions: 1.16.18
3.6.18

Scale: 1"=10'-0"

Amenities Plan

Sheet No.

L-5.0

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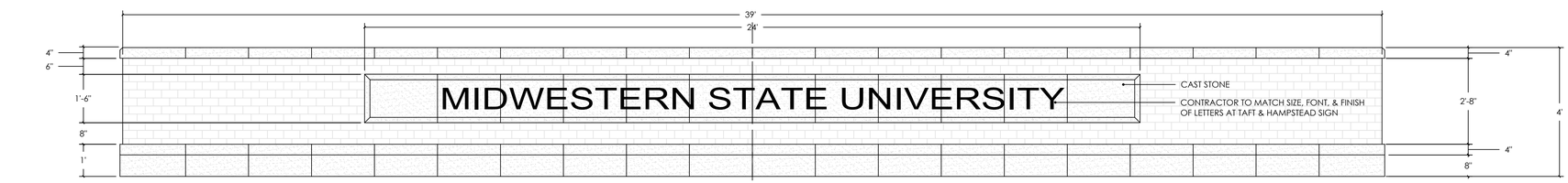
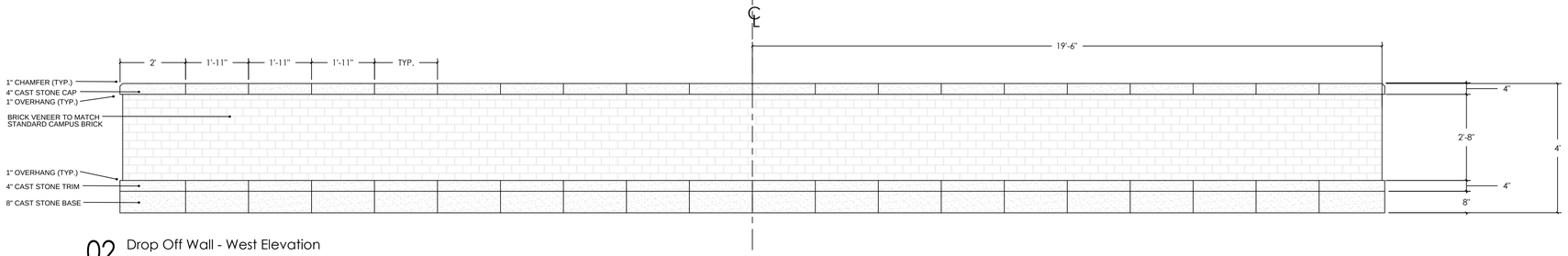
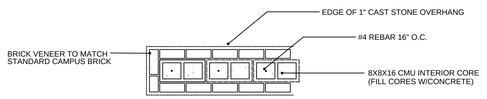


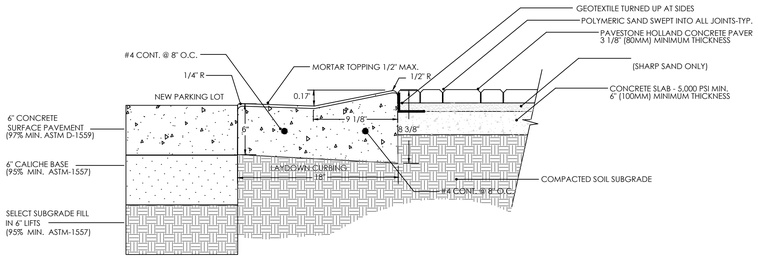
01 Drop Off Wall - East Elevation
SCALE: 1/2" = 1'-0"



02 Drop Off Wall - West Elevation
SCALE: 1/2" = 1'-0"



05 Drop Off Wall - Plan View Section
SCALE: 1/2" = 1'-0"



06 Laydown Curb W/ Paver Walk
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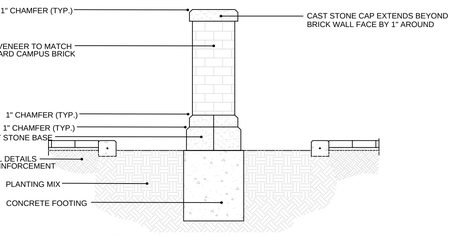
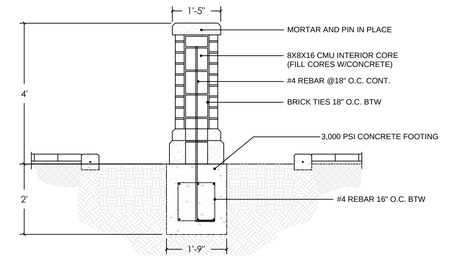
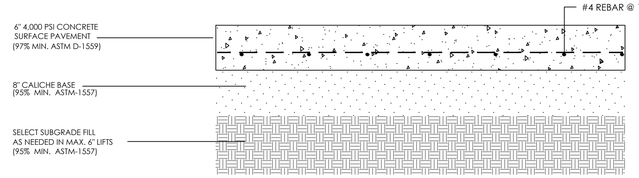


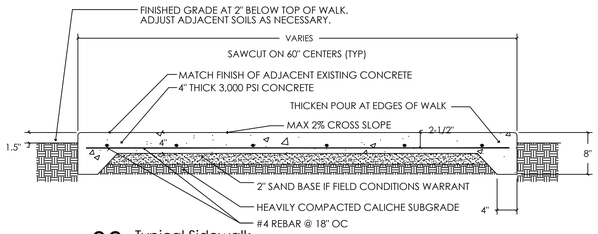
03 Drop Off Wall - Elevation
SCALE: 1/2" = 1'-0"



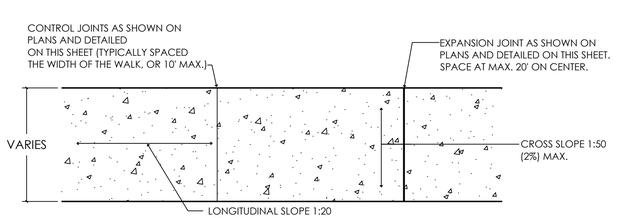
04 Drop Off Wall - Section
SCALE: 1/2" = 1'-0"



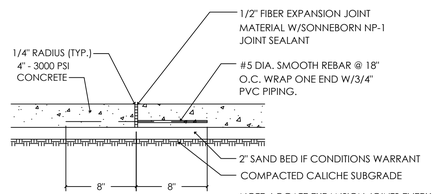
07 Concrete Parking Lot Section
SCALE: NTS



08 Typical Sidewalk
SCALE: NTS

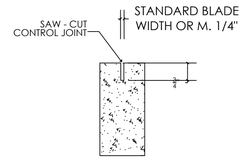


09 Typical Sidewalk
SCALE: NTS

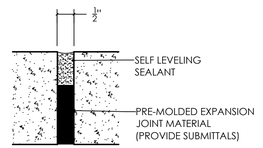


NOTE: LOCATE EXPANSION JOINTS EVERY 20' O.C. (TYP); CONTROL JOINTS EVERY 10' O.C. (TYP)

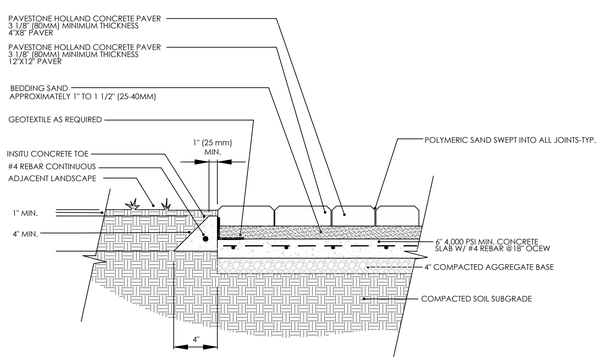
10 Concrete Cold Joint
SCALE: NTS



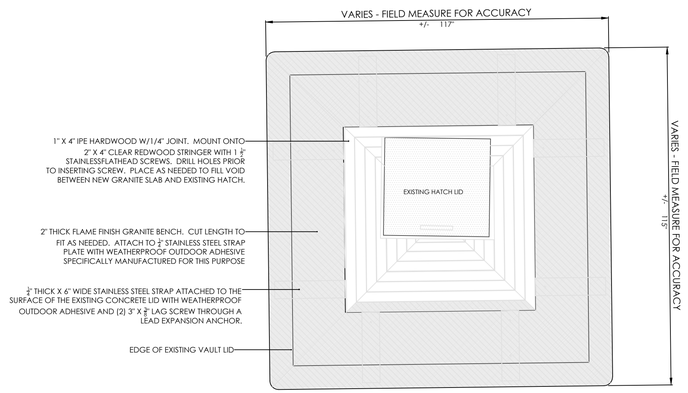
11 Control Joint
SCALE: NTS



12 Expansion Joint
SCALE: NTS

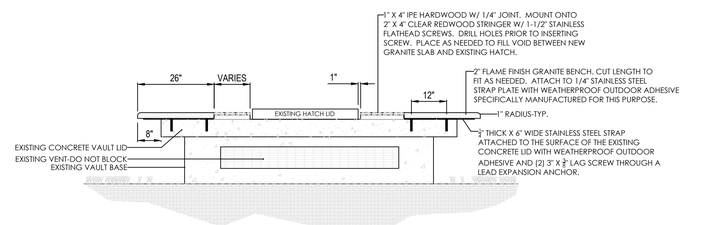


13 Standard Fire Lane Paver W/ Toe Edge
SCALE: NTS

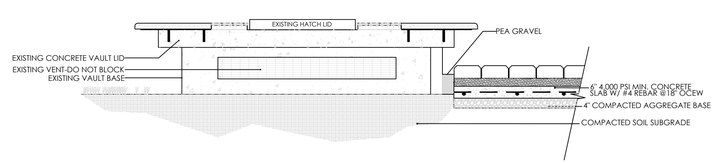


NOTE: DO NOT ASSUME EXISTING VAULT AND/OR VAULT HATCH LID ARE PROPORTIONALLY SQUARE. FIELD MEASURE AND CUSTOM CUT ALL WOOD AND GRANITE FOR INSTALLATION. PROVIDE GRANITE SAMPLES TO OWNER AND LANDSCAPE ARCHITECT FOR APPROVAL.

14 Tunnel Hatch Bench - Plan
SCALE: NTS



15 Tunnel Hatch Bench - Section
SCALE: NTS



16 Pavers Adjacent to Tunnel Hatch
SCALE: NTS

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4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
Phone: 432.686.8001
Facsimile: 432.683.3487
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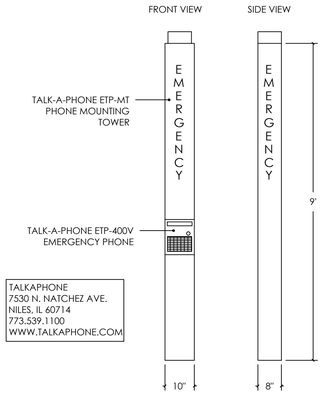
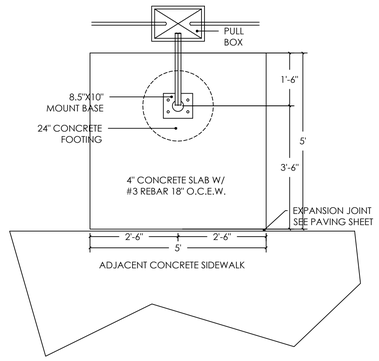
HS + HS QUAD DEVELOPMENT PLANS
WICHITA FALLS, TX

Date: 12.21.17
Revisions: 1.16.18
3.6.18

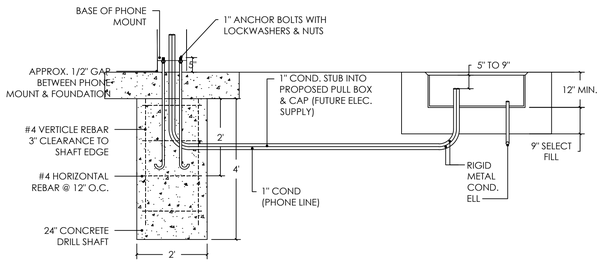
Scale: As Shown
Details
Sheet No.
L-6.0



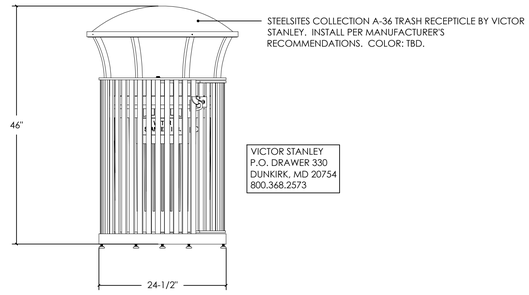
01 Emergency Call Box Mount
SCALE: NTS



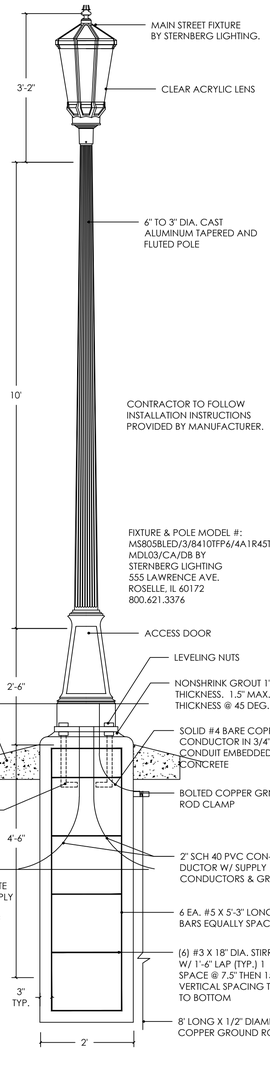
02 Emergency Call Box Pad
SCALE: NTS



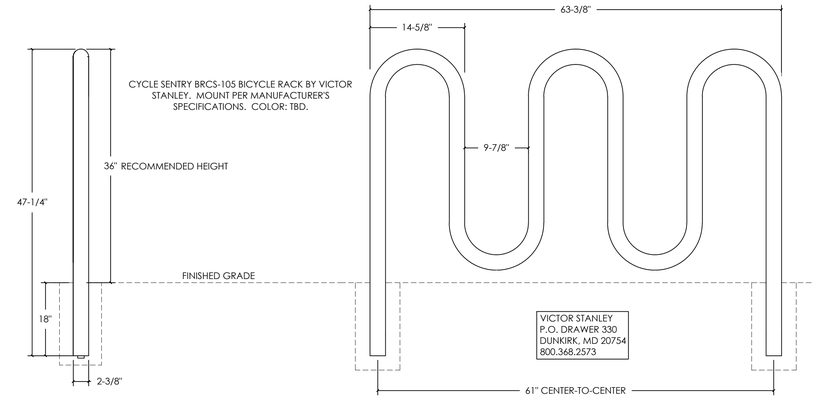
03 Emergency Call Box Section
SCALE: NTS



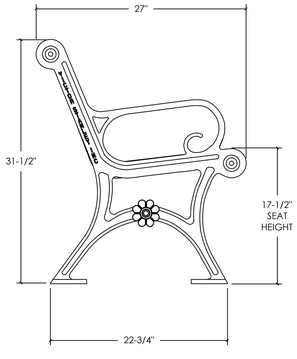
04 Trash Receptacle
SCALE: NTS



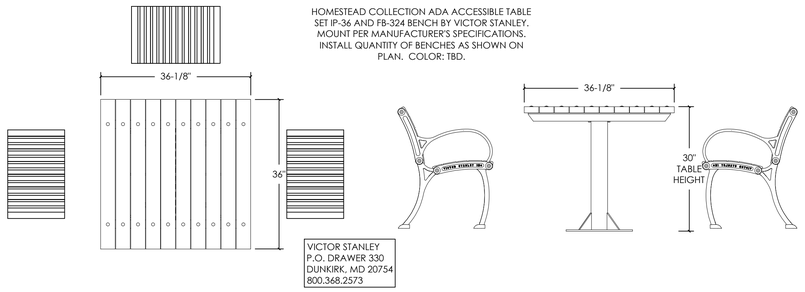
07 Site Lighting
SCALE: NTS



05 Bicycle Rack
SCALE: NTS



06 Bench
SCALE: NTS



08 Table Set
SCALE: NTS

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4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
Phone: 432.684.8051
Facsimile: 432.683.3487
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WICHITA FALLS, TX

HS + HS QUAD DEVELOPMENT PLANS

Date: 12.21.17
Revisions: 1.16.18
3.6.18

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Details

Sheet No.
L-6.1

SECTION 01010
SUMMARY OF WORK, MUSTANG WALK EXTENSIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The Project name is "Mustang Walk North/South Extension Plans". The North section is the first Alternate and the South section is the second Alternate of the Quad Landscaping contract.

1. Project Location: Midwestern State University, Wichita Falls, Texas

B. Contract Documents were prepared for the project by:

KDC Associates
4400 N. Big Spring, Suite 203
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C. The Work consists of the preparation and installation of landscape elements and related amenity and site work at the new Project.

D. The Work will be constructed under a single prime contract.

E. Construction of the HS+HS Landscaping is a separate contract which may or may not be issued to the same contractor as the Quad Landscaping contractor. The Mustangs Walk Extensions are Alternates for the Quad Landscaping contract.

F. Work for the Mustangs Walk Extensions shall begin on May 14, 2018 with Substantial Completion by August 17, 2018. Work to occur simultaneously with the Quad Landscaping Project.

1.3 WORK UNDER OTHER CONTRACTS

A. Construction of the HS+HS building is under a separate contract where the construction process was initiated in February 2018.

B. The Quad Landscaping contractor shall be responsible for coordination of the work described in these specs and drawings so as NOT to hinder the completion of construction related to the HS+HS building, north parking lot, utilities for the new building, or the storm water pollution prevention plan for the new building. These projects are scheduled for Substantial Completion to occur on May 16, 2019 and Final Completion on June 14, 2019.

C. When performing work on the HS+HS site while in the care and custody of Trinity Hughes Sundt, Subcontractor must follow Sundt's project safety plan. The plan is inclusive of 100% hard hat, high visibility clothing, eye protection, shirts with sleeves and hard soled shoes (no tennis shoes).

D. Work hours for the HS+HS site are 7:00 AM to 5:00 PM, Monday – Friday. After hours work and weekend work will be accommodated with 72 hour notice. A Trinity Hughes Sundt employee must be present when any work is being performed on the HS+HS site.

E. Cooperate fully with separate contractors for HS+HS so that work under those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.

1.4 CONTRACTOR USE OF PREMISES

A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.

1. Owner Occupancy: Allow for Owner occupancy of the existing building and use by the public during the construction period.
2. Driveways and Entrances: Keep driveways and entrances outside the contract limits clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

B. Use of the Existing Building: Maintain the existing building in a weathertight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.

1.5 OCCUPANCY REQUIREMENTS

A. Full Owner Occupancy: The Owner may occupy the site and existing building during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate owner usage. Perform the Work so as not to interfere with the Owner's operations.

B. Partial Owner Occupancy: The Owner reserves the right to occupy and to place and install equipment in completed areas of the building prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.

END OF SECTION 01010

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

Section Includes:

Cast-in-place normal weight and lightweight concrete, placement and finishing.

Related Requirements:

Division 01 - General Requirements.

Section 32 1313: Site Concrete Work.

Section 03 1000: Concrete Forming and Accessories.

Section 03 2000: Concrete Reinforcing.

Section 07 2600: Vapor Barriers.

1.02 REFERENCES

American Concrete Institute (ACI) Publication:

ACI 117 – Specifications for Tolerances for Concrete Construction and Materials.

ACI 301 – Specifications for Structural Concrete.

ACI 302.1R – Guide for Concrete Floor and Slab Construction.

ACI 305R - Specification for Hot Weather Concreting.

ACI 306.1 – Standard Specification for Cold Weather Concreting.

ACI 308R – Guide to External Curing of Concrete.

ACI 318 - Building Code Requirements for Structural Concrete, as modified by CBC Sections 1903A and 1905A.

American Society for Testing and Materials (ASTM) Standards:

ASTM C31 – Standard Specification for Making and Curing Concrete Test Specimens in the Field.

ASTM C33 - Standard Specification for Concrete Aggregates.

ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

ASTM C88 - Standard Test Method for Soundness of Aggregates by use of Sodium Sulphate or Magnesium Sulphate.

ASTM C94 - Standard Specification for Ready-Mixed Concrete.

ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.

ASTM C150 - Standard Specification for Portland Cement.

ASTM C156 – Standard Test Method for Water Loss (from a Mortar Specimen) Through Liquid membrane-Forming Curing Compounds for Concrete.

ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.

ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete.

ASTM C173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete.

ASTM C289 - Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).

ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
ASTM C567 - Standard Test Method for Determining Density of Structural Lightweight Concrete.
ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
ASTM C845 - Standard Specification for Expansive Hydraulic Cement
ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
ASTM C1315 – Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
ASTM D1308 – Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
ASTM C1567 - Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method).
ASTM D1751 - Standard Test Method for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
ASTM D7234 – Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.
ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
ASTM E1745 - Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In Situ Probes.
ASTM F3010 – Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use under Resilient Floor Coverings.

1.03 SUBMITTALS

Shop Drawings: Submit Shop Drawings indicating locations of cast-in-place concrete Work and accessory items such as vapor barriers. Include details and locations of reinforcing, embedded items, and interfacing with other Work.

Mix Design Data: Submit concrete mix designs as specified herein and in Article 2.02. Submit name, address and telephone number of the concrete production facility which the contractor intends to engage to design the concrete mixes. Submit name and qualifications of the proposed concrete technologist.

Mix Design: Submit a concrete mix design for each strength and type of concrete indicated in the drawings or specified. Include water/cement ratio, source, size and amount of coarse aggregate and admixtures. Predict minimum compressive strength, maximum slump and air content percentage. Clearly indicate locations where each mix design will be used.
Water/cement ration for concrete slabs on grade shall be 0.50 maximum.

Test Reports: Submit copies of test reports showing that the proposed mixes produce concrete with the strengths and properties specified. Include tests for cement, aggregates and admixtures. Provide gradation analysis.

Material Samples: Submit Samples illustrating concrete finishes and hardeners, minimum 12-inch by 12-inch.

Certificates: Submit certification that each of the following conforms to the standards indicated:
Portland cement: ASTM C150.
Normal weight concrete aggregates: ASTM C33.
Lightweight concrete aggregates: ASTM C330.

Aggregates: Submit evidence that the aggregate is not reactive in the presence of cement alkalis. In the absence of evidence, aggregate shall be tested by one of the methods in ASTM C33 Appendix XI, Methods for Evaluating Potential for Deleterious Expansion Due to Alkali Reactivity of an Aggregate. Aggregates deemed to be deleterious or potentially deleterious may be used with the addition of a material that has been shown to prevent harmful expansion in accordance with Appendix XI of ASTM C33, when approved by the building official, in accordance to CBC Section 1903A5A.
Curing materials: ASTM C171.
Admixtures: Submit product data for proposed concrete admixtures.

1.04 QUALITY ASSURANCE

Continuous inspection shall be provided at the batch plant and for transit-mixed concrete to run check sieve analysis of aggregate, check moisture content of fine aggregate, check design of mix, check cement being used with test reports, check loading of mixer trucks, and certify to quantities of materials placed in each mixer truck.
Inspection shall be performed by a representative of a testing laboratory selected by the OWNER. OWNER will pay for inspection costs. Notify the laboratory 24 hours in advance of time concrete is to be mixed. Notify the laboratory of postponement or cancellation of mixing within at least 24 hours of scheduling time.
CONTRACTOR shall assist the testing laboratory in obtaining and handling samples at the project site and at the source of materials.
Continuous batch plant inspection requirement may be waived in accordance with CBC Section 1705A.3.3.1. Waiver shall be in writing, including DSA approval. When batch plant inspection is waived by DSA, the following requirements shall be met:
Approved inspector of the testing laboratory shall check the first batching at the start of work and furnish mix proportions to the licensed weightmaster.
Licensed weightmaster shall positively identify materials as to quantity and certify to each load by a ticket.

Tickets shall be transmitted to the Inspector by a truck driver with load identified thereon. The Inspector will not accept the load without a load ticket identifying the mix and will keep a daily record of placements, identifying each truck, its load and time of receipt and approximate location of deposit in the structure and will transmit a copy of the daily record to DSA.
At the end of the project, the weightmaster shall furnish an affidavit to DSA certifying that all concrete furnished conforms in every particular to proportions established by mix designs.
Special Inspections and Tests shall be in accordance with CBC Chapter 17A, Reinforcement and Anchor testing per CBC Section 1910A and Specification Section 01 4523.

1.05 DELIVERY, STORAGE AND HANDLING

Store cement and aggregate materials so as to prevent their deterioration or intrusion by foreign matter. Deteriorated or contaminated materials shall not be furnished.
Packaged materials shall bear the manufacturers and brand name label, and shall be stored in their original unbroken package in a weather tight place until ready for use in the work.

1.06 PROJECT CONDITIONS

Cold Weather Requirements: Batching, mixing, delivering and placing of concrete in cold weather shall comply with the applicable requirements of ACI 306.1.
Hot Weather Requirements: Batching, mixing, delivering and placing of concrete in hot weather shall comply with the applicable requirements of ACI 305R.
Concrete temperature of freshly mixed concrete shall be determined per ASTM C1064.

PART 2 - PRODUCTS

2.01 MATERIALS

Cement: ASTM C150. Portland Cement.
Aggregates: Conform to the following standards:
Normal weight concrete: ASTM C33.
Lightweight concrete: ASTM C330, with fine aggregates per ASTM C33.
Aggregate shall be tested for Potential Alkali Reactivity of Cement-Aggregate Combinations per ASTM C289.
Nominal maximum size of coarse aggregate shall be no larger than:
1/5 the narrowest dimension between sides of forms, nor
1/3 the depth of slabs, nor
3/4 the clear spacing between individual reinforcing bars or wires, bundles of bars, individual tendons, or ducts.
CONTRACTOR may request the ARCHITECT and DSA waiver of the above limitations reported per ACI 318, provided that the workability and methods of consolidation are such that the concrete can be placed without honeycombs or voids.
Water: Water for concrete mixes, curing and cleaning shall be potable and free from deleterious matter.
Admixtures: Shall be shown capable of maintaining essentially the same composition and performance throughout the work as the product used in establishing concrete proportions in accordance with ACI 318, Section 3.6.
Admixtures containing chlorides or sulfides are not permitted.

Air-entraining admixtures shall comply with ASTM C260. Air-entrained admixtures shall not be used for floor slabs to receive steel trowel finish.
Admixtures for water reduction and setting time modification shall conform to ASTM C494.
Admixtures for producing flowing concrete shall conform to ASTM C1017.
Admixtures containing ASTM C845 expansive cements shall be compatible with the cement and produce no deleterious effects.
Silica fumes used as an admixture shall conform to ASTM C1240.
Reinforcement Fibers: Chop strands of alkali-resistant polypropylene or nylon fibers added to the concrete mix for protection against shrinkage cracks.
Expansion Joint Fillers: Preformed strips, non-extruding and resilient bituminous type, of thickness indicated, conforming to ASTM D1751.

Curing:

Curing Paper: Shall conform to ASTM C171 and consist of two sheets of kraft paper cemented together with a bituminous material in which are embedded cords or strands of fiber running in both directions. The paper shall be light in color, shall be free of visible defects, with uniform appearance.
Elevated slabs and slabs on grade may be cured at CONTRACTOR's option with curing and proactive water vapor emission and alkalinity control system. Products shall be approved by OWNER's Office of Environmental Health and Safety.
VaporSeal 309, by Floor Seal Technology, Inc., or equal.

ASTM C156:	0.39 kg/m².
ASTM C309:	Exceeds requirements.
ASTM C1315:	Exceeds requirements.
ACI 308R-01	Compliant.

Remedial Treatment: Water vapor emission and alkalinity control treatment, MES 100 by Floor Seal Technology, Inc. or equal.

ASTM E96:	<0.1 Perms.
ASTM D1308:	14pH Resistant.
ASTM D7234:	500+psi 100% concrete failure.
ASTM F2170:	100%RH resistant.
VOC Content:	<100 g/L, meets SCAQMD Rule #1113.
ASTM F3010:	Meets Requirements.

Self-leveling Compounds: Ardex Engineered Cements, K15, Combimix; Leveler 720. Armstrong, S-194, or equal.
Floor Hardener: Water soluble, inorganic, silicate-based curing, hardening, sealing and dustproofing compound. Aquaseal W20 by Monopole Inc., Kure-N-Harden by BASF, Chem Hard by L&M, Liqui-Hard by W. R. Meadows, or equal.
Underlayment: Two component latex underlayment for filling low spots in concrete for both interior and exterior applications, from featheredge to a maximum of 3/8 inch in thickness. Underlayment shall be non-shrink and suitable for repairing exposed concrete surfaces and for underlayment of carpet, resilient, tile and quarry floor coverings. La-O-Tex by TexRite, Underlay C, RS by Mer-Krete Systems, Underlayment 962 by C-Cure, or equal.
Vapor Barrier: Refer to Section 07 2600, Vapor Barriers.
Stair Treads and Nosings: Two part stair tread and nosing with ribbed abrasive bars. Fabricated from 6063-T5 or 6063-T6 extruded aluminum, mill finish. Anti-slip abrasive

filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Color shall extend uniformly throughout filler.
American Safety Tread: TP-311R.
Balco Inc.: DST-330.
Nystrom: STTB-P3.375E.
Wooster Products Inc.: WP-RN3SG.
Equal.
Grout: ASTM C1107, non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 7 days; of consistency suitable for application and a 30 minute working time.

2.02 CONCRETE MIX

Mix shall be signed and sealed by a Civil or Structural Engineer currently registered in the State of California.
Strength of Concrete: Strengths and types of concretes shall be as indicated in the Drawings. Unless otherwise indicated or specified, concrete shall be provided with minimum 28-day strength of 3000 psi (f'c).
Concrete mix shall meet the durability requirements of ACI 318, Chapter 4.
Concrete proportioning shall be determined on the basis of field experience and/or trial mixtures shall in accordance with ACI 318, Section 5.3. Proportions of materials shall provide workability and consistency to permit concrete to be placed readily into forms and around reinforcement under conditions of placement to be employed, without segregation or excessive bleeding.
Ready-Mixed Concrete: Mix and deliver in accordance with requirements of ASTM C94.

PART 3 - EXECUTION

3.01 GENERAL

Surfaces to receive concrete shall be free of debris, standing water, and any other deleterious substances before start of concrete placing.
Time of Placing: Do not place concrete until reinforcement, conduits, outlet boxes, anchors, hangers, sleeves, bolts, and other embedded materials are securely fastened in place. Contact the Inspector at least 24 hours before placing concrete; do not place concrete until inspected by the Project Inspector.
Pouring Record: A record shall be kept on the Project site of time and date of placing concrete in each portion of structure. Such record shall be maintained on the Project site until Substantial Completion and shall be available for examination by the ARCHITECT and DSA.

3.02 TOLERANCES

Concrete construction tolerances shall be as specified in ACI 117 and as modified herein.
Floor Flatness (FF) and Floor Levelness (FL) shall be as indicated below:
Refer to ACI 302.1R, Tables 8.1 and 8.2 Slab on Ground and Suspended Flatness/Levelness Construction Guide, for recommended concrete placing and finishing methods.
Floor Flatness and Floor Levelness shall be tested in accordance to ASTM E1155.
Floor measurements shall be made within 48 hours after slab installation, and shall precede removal of shores and forms.

3.03 PREPARATION

For installation of vapor barrier refer to Section 07 2600, Vapor Barriers.

Reglets and Rebates:

Form reglets and rebates in concrete to receive flashing, frames and other equipment as detailed and required. Coordinate dimensions and locations required with other related Work. If concrete slabs on grade adjoin a wall or other perpendicular concrete surface, form a reglet in wall to receive and carry horizontal concrete Work. Reglet shall be full thickness of the slab and shall be 3/4 inch wide, unless otherwise indicated. Requirement does not apply to exterior walks, unless specifically indicated.

Screeds: Install screeds accurately and maintain at required grade or slab elevations after steel reinforcement has been installed, but before starting to place concrete. Install screeds adjacent to walls and in parallel rows not to exceed 8 feet on centers.

3.04 INSTALLATION

Conveying and Placing:

Concrete shall be placed only under direct observation of the Project Inspector. Do not place concrete outside of regular working hours, unless the Inspector has been notified at least 48 hours in advance.

Concrete shall be conveyed from mixer to location of final placement by methods that will prevent separation or loss of materials.

Concrete shall be placed as nearly as practicable to its final position to avoid segregation due to re-handling or flowing. No concrete that has partially hydrated or has been contaminated by foreign materials shall be placed, nor shall re-tempered concrete or concrete which has been remixed after initial set be placed.

In placing concrete in columns, walls or thin sections, provide openings in forms, elephant trunks, tremies or other recognized devices, to prevent segregation and accumulation of partially hydrated concrete on forms or metal reinforcement above level of concrete being placed. Such devices shall be installed so that concrete will be dropped vertically. Unconfined vertical drop of concrete from end of such devices to final placement surface shall not exceed 6 feet.

Concrete shall be placed as a continuous operation until placing of panel or section is completed. Top surfaces of vertically formed lifts shall be level.

Concrete shall be thoroughly consolidated by suitable means during placement, and shall be thoroughly worked around reinforcement and embedded fixtures and into corners of forms.

Where conditions make consolidation difficult or where reinforcement is congested, batches of mortar containing same proportions of cement, sand, and water as provided in the concrete, shall first be deposited in the forms to a depth of at least one inch.

Cold Weather:

Provide adequate equipment for heating concrete materials and protecting concrete during freezing or near-freezing weather. All ground with which concrete is to come in contact shall be free from frost. No frozen materials or materials containing ice shall be used.

The temperature of concrete at the time of placement shall not be below the minimum temperatures given in Table 3.1 of ACI 306.1.

Concrete shall be maintained at a temperature of at least 50° F. for not less than 72 hours after placing or until it has thoroughly hardened. Cover concrete and provide

sufficient heat as required. When necessary, aggregates shall be heated before mixing. Special precautions shall be taken for protection of transit-mixed concrete.

Hot Weather:
Concrete to be placed during hot weather shall comply with the requirements of ACI 318, Section 5.13.
Maintain concrete temperatures indicated in Table 2.1.5 of ACI 305R to prevent the evaporation rate from exceeding 0.2 pound of water per square feet of exposed concrete per hour.
Cool concrete using methods indicated in ACI 305R Appendix B.
Place and cure concrete as specified in ACI 305R Chapter 4.
Compaction and Screeding:
Tamp freshly placed concrete with a heavy tamper until at least 3/8 inch of mortar is brought to surface. Concrete shall then be tamped with a light tamper and screeded with a heavy straightedge until depressions and irregularities are eliminated, and surface is true to finish grades or elevations. Remove excess water and debris.
Where slabs are to receive separate cement finish or mortar setting bed, continued tamping to raise mortar to surface is not performed. Laitance shall be removed by brushing with a stiff brush or by light sandblasting to expose clean top surface of coarse aggregate.

Floating and Troweling:
When concrete has hydrated sufficiently, it shall be floated to a compact and smooth surface. After floating, wait until concrete has reached proper consistency before troweling. Top surfaces shall receive at least 2 troweling operations with steel hand trowel. Prior to and during final troweling, apply a fine mist of water frequently with an atomizing type fog sprayer. Omit troweling for slabs to receive a separate cement finish. For interior finish slabs, final troweling shall provide a hard, impervious, and non-slip surfaces, free from defects and blemishes. Finished surface shall be within tolerances indicated in Article 3.02. Avoid burnishing. Do not add cement or sand to absorb excess moisture.

Exterior Paving and Cement Walks: Finish as specified above, except surface shall be given a non-slip broom finish to match Sample reviewed by the ARCHITECT.
Vertical concrete surfaces shall be finished smooth and free from marks or other surface defects.

3.05 CURING

Length of time, temperature and moisture conditions for curing concrete shall be in accordance with ACI 318, Section 5.11.
Forms containing concrete, top of concrete between forms, and exposed concrete surfaces after removal of forms shall be maintained in a thoroughly wet condition for at least 7 consecutive days after placing. If weather is hot or surface has dried out, spray surface of concrete slabs and paving with fine mist of water, starting not later than 2 hours after final troweling and continuing until sunset. Surface of finish shall be kept continuously wet until curing medium has been installed. Immediately after finishing, monolithic floor slabs shall be covered with curing paper. Paper shall be lapped 4 inches at joints and sealed with waterproof sealer. Edges shall be cemented to finish. Repair or replace paper damaged during construction operations.

When curing slabs with proactive water vapor emission and alkalinity control system: Coordinate and schedule application of curing compound with concrete pour schedule, while conforming to manufacturer's application instructions.
When the surface of the concrete has hardened sufficiently to sustain foot traffic pre-cure slabs with liquefied product application following manufacturer's written instructions. Application shall be by trained applicators.
Monitor Environmental Conditions: Set up weather station 20 to 30 inches above freshly placed concrete. Record temperature, humidity and wind velocity measurements at 15 minute maximum intervals.

Calculate Evaporation Rate: Use recorded weather information in combination with nomograph per ACI 308R, Figure 4.1, Guide to Curing Concrete, to evaluate relevant evaporation rate. When the bleed water rate of the concrete is approximately equal to the surface water evaporation rate, spray curing compound material throughout surface of slabs and decks, following manufacturer's written instructions. Application shall be by trained applicators. Perform the following tests at least 28 days after placement of concrete and prior to floor covering installation. Submit to OAR test results indicating locations that do not comply with scheduled flooring installation requirements.
Calcium chloride testing per ASTM F1869.
Relative humidity testing per ASTM F2170.
Alkalinity testing per ASTM F710.
Perform concrete bond layer humidity meter testing to determine substrate surface acceptability.
Areas emitting moisture and alkalinity at rates exceeding floor covering manufacturer's published ASTM F1869 limits, shall receive a corrective coating, at no cost to the OWNER, as follows:
Mask and protect adjacent walls and floor surfaces from effects of scarification and application of remedial treatment.
Scarify slab surface in area of application by shot blasting or other method acceptable to corrective coating manufacturer.

Prepare and fill cracks, control joints and cold joints.
Apply two-component modified epoxy penetrant and coating with roller and squeegee over required treatment area; saturate surfaces to ensure a through mechanical bond.
Clean and fill divots, chips, voids and other surface irregularities with one hundred percent Portland cement based patching compound or cementitious fill.
Apply cementitious surfacing over coating in areas to receive resilient and wood floor coverings to facilitate adhesion; apply to a thickness of 1/8 inch.

3.06 FILLING, LEVELING AND PATCHING

Concrete slabs exhibiting high or low spots and indicated to receive resilient floor covering or soft floor covering, shall have surfaces repaired. High spots shall be honed, or ground with power-driven machines to required tolerances. Low spots shall be filled with latex underlayment, installed in strict accordance with manufacturer's written recommendations.
Holes resulting from form ties or sleeve nuts shall be solidly packed, through exterior walls, by pressure grouting with cement grout, as specified. Grouted holes on exposed surfaces shall be screeded flush and finished to match adjoining surfaces.

Cement Base: Cement base shall be of the height, thickness, and shape detailed. Base shall be reinforced with one inch mesh, 18 gage, zinc-coated wire fabric. Base finish mixture shall be one part Portland cement, 2 parts of fine aggregate and one part pea gravel. Colored cement base shall include a chemically inert mineral oxide pigment in the mix.

3.07 FINISHING

Soda and Acid Wash: Concrete surfaces to receive plaster, paint or other finish, and which have been formed by oil coated forms, shall be scrubbed with a solution of 1-1/2 pounds of caustic soda to one gallon of water. Surfaces where smooth wood or waste molds have been furnished shall be scrubbed with a solution of 20 percent muriatic acid. Wash with clean water after scrubbing.

Sacking: Exposed concrete curbs, walls, and other surfaces shall be sacked by an application of Portland cement grout, floated, and rubbed. Sacking shall not be performed until patching and filling of holes has been completed. Entire sacking operation for any continuous area shall be started and completed within the same day. Mix one part Portland cement and 1-1/2 parts fine sand with sufficient water to produce a grout having consistency of thick paint. Wet surface of concrete sufficiently to prevent absorption of water from grout. Apply grout uniformly with a brush or spray gun, then immediately float surface with a cork or other suitable float, scouring wall vigorously. While grout is still plastic, finish surface with a sponge-rubber float, removing excess grout. Allow surface to dry thoroughly, then rub vigorously with dry burlap to completely remove dried grout. No visible film or grout shall remain after rubbing with burlap.

Sandblasting: Exterior concrete surfaces to receive stucco dash coat finish, where plywood or other smooth forms have been furnished, shall be uniformly sand-blasted with sharp quartz sand under sufficient air pressure to remove dirt, form oil and other foreign materials, and roughen surface to provide a proper bond. Such surfaces shall be thoroughly washed with clean water after sandblasting.

Abrasive: Concrete stair treads, landings, ramps and steps on interior and exterior of buildings, and interior exposed concrete floors in shop buildings shall receive an abrasive finish.

Floor Hardener: Exposed interior concrete floors throughout shall be treated with floor hardener.

Protect adjacent surfaces. Clean surfaces to receive treatment in accordance with manufacturer's instructions, ensuring that all stains, oil, grease, form release agents, laitance, dust and dirt are removed prior to application. Apply hardener in accordance with manufacturer’s instructions as soon as concrete is firm enough to work on after final troweling.

Cement Grout and Dry-Pack Concrete: Cement grout shall be mixed at the Project site and shall be composed of one volume of Portland cement and 2-1/2 volumes of fine aggregate. Materials shall be mixed dry with sufficient water added to make mixture flow under its own weight. When grout is used as a dry pack concrete, add sufficient water to provide a stiff mixture, which can be molded into a sphere.

Broom Finish: Exterior stair treads and landings shall be provided with a non-slip broom finish in addition to abrasive finish specified.

Abrasive Stair Nosing: Nosing shall be installed according to manufacturers written recommendations.

3.08 EXPANSION AND CONSTRUCTION JOINTS

Construction Joints: Details and proposed location of construction joints shall be as indicated on the Drawings, located to least impair strength of structure, in accordance with the following:

Thoroughly clean contact surface by sand blasting entire surface not earlier than 5 days after initial placement. A mix containing same proportion of sand and cement provided in concrete plus a maximum of 50 percent of coarse aggregate shall be placed to a depth of at least one inch on horizontal joints. Vertical joints shall be wetted and coated with a neat cement grout immediately before placing of new concrete. Should contact surface become coated with earth, sawdust, or deleterious material of any kind after being cleaned, entire surface shall be re-cleaned before applying mix.

Expansion Joints: Provide expansion joints where indicated in walks and exterior slabs. Space approximately 20 feet apart, unless otherwise indicated. Joints shall extend entirely through slab with joint filler in one piece for width of walk or slab. Joint filler shall be 3/8 inch thick, unless otherwise indicated.

Tooled Joints: Slabs, walks and paving shall be marked into areas as indicated with markings made with a V-grooving tool. Marks shall be round-edged, free from burrs or obstructions, with clean cut angles and shall be straight and true. Walks, if not indicated, shall be marked off into rectangles of not more than 12 square feet and shall have a center marking where more than 5 feet wide.

3.09 TESTING

Molded Cylinder Tests:

Inspector or testing lab personnel will prepare cylinders and perform slump tests. Samples for concrete strength shall be taken in accordance to ASTM C172. Each cylinder shall be dated, given a number, point in structure from which sample was obtained, mix design number, mix design strength and result of accompanying slump test noted. Separate tests of molded concrete cylinders obtained at same place and time shall be made at age of three days, seven days, and 28 days. A strength test shall be the average of the compressive strength of two cylinders, obtained from the same sample of concrete and tested at 28 days or at test age designated for determination of f'c.

Test cylinders shall be prepared at the Project site and stored in testing laboratory in accordance with ASTM C31, and tested in accordance with ASTM C39.

Core Test: At request of the ARCHITECT, cores of hardened concrete shall be cut from portions of hydrated structures for testing, in accordance with CBC and ASTM C42. Provide 4 inch diameter cores at representative places throughout the structure as designated by the ARCHITECT. In general, provide sufficient cores to represent concrete placed with at least one core for each 4,000 square feet of building area, and

at least 3 cores total for each Project. Where cores have been removed, fill voids with drypack, and patch the finish to match the adjacent existing surfaces.

Concrete Consistency: Measure consistency according to ASTM C143. Test twice each day or partial day's run of the mixer.

Adjustment of Mix: If the strength of any grade of concrete for any portion of Work, as indicated by molded test cylinders, falls below minimum 28 days compressive strength specified or indicated, adjust mix design for remaining portion of construction so that resulting concrete meets minimum strength requirements.

Air Content Testing: Measure in accordance to ASTM C173 or ASTM C231, for each composite sample taken in accordance to ASTM C172.

Defective Concrete:
Should strength of any grade of concrete, for any portion of Work indicated by tests of molded cylinders and core tests, fall below minimum 28 days strength specified or indicated, concrete will be deemed defective Work and shall be replaced or adequately strengthened in a manner acceptable to the ARCHITECT.
Concrete Work that is not formed as indicated, is not true within 1/250 of span, not true to intended alignment, not plumb or level where so intended, not true to intended grades and levels, contains sawdust shavings, wood or embedded debris, or does not fully conform to Contract provisions, shall be deemed to be defective Work and shall be removed and replaced. Concrete for Equipment Pads, Mechanical and Electrical Work: Unless otherwise indicated, strength shall have a minimum f'c = 3,000 psi. Exposed concrete shall be provided with a hand trowel finish with radius corners and edges. Form and place concrete where necessary as described in Section 03 1000 Concrete Forming and Accessories, and reinforced as described in Section 03 2000 Concrete Reinforcing. Calcium chloride shall not be furnished in any concrete mix provided for the installation of underground electrical conduits. For concrete encasement of more than one conduit, furnish 3/4 inch maximum aggregate.

3.10 CLEAN UP

Remove rubbish, debris and waste materials and legally dispose of off the Project site.

3.11 PROTECTION

Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 10 17 16

TELEPHONE ENCLOSURES

PART 1 GENERAL

1.01 SUMMARY

A. Equipment and materials used shall be standard components that are manufactured and available for purchase as standard replacement parts as long as the product is commercially available from the manufacturer.

1.02 QUALITY ASSURANCE

A. All tower installation, configurations, setup, program and related work shall be performed by electronic technicians thoroughly trained by the manufacturer in the installation and service of the equipment provided.

B. The tower shall be warrantied against any defects in material and workmanship under normal use for a period of five (5) years from date of installation, provided that manufacturer receives a completed "Installation Certification" certifying the date on which the system has been installed. An "Installation Certification" card shall be enclosed with every unit. In the event that no "Installation Certification" is received by manufacturer, the five (5) years will commence on the date of shipment by the manufacturer.

C. The blue light and faceplate light shall be warrantied against any defects in material and workmanship under normal use for a period of twenty-four (24) months from date of installation, provided that manufacturer receives a completed "Installation Certification" certifying the date on which the system has been installed. An "Installation Certification" card shall be enclosed with every unit. In the event that no "Installation Certification" is received by manufacturer, the twenty four (24) months will commence on the date of shipment by the manufacturer.

1.03 CERTIFICATIONS AND STANDARDS

A. The tower as an assembly shall be certified to:

1. UL Std 60950-1

B. The included LED blue light (model: ETP-EL or ETP-EL12/24) shall be certified to:

1. UL Std 1598

2. CSA Std C22.2 No. 250.0

PART 2 PRODUCTS

2.01 GENERAL

A. The tower shall:

1. Consist of a highly vandal-resistant free-standing steel emergency phone tower mount with an integrated flashing LED blue light.

2. Have an integrated LED faceplate light, mounted directly above the phone faceplate.

2.02 HARDWARE

A. The tower shall:

1. Be constructed of 0.25” thick steel and weigh approximately 300 lbs.

2. Measure:

a. Tower only: 10” W x 8” D x 108” H, with a 0.5” radius on each corner.

b. Tower and Blue Light: 10” W x 8” D x 114” H.

3. Utilize a high-gloss, multi-coat, corrosion-inhibitive coating that shall be applied to withstand prolonged exposure to hard environments.

a. Tower shall be sandblasted to SSPC-6 standards before a 2-3 mil layer of rust-inhibitive primer is applied.

b. Tower shall be hand sanded for smoothness before a second 2-3 mil layer of primer is applied.

c. Tower shall have a 2-3 mil layer of customer specified color coat applied.

d. Tower shall have a 1-2 mil layer of clear coat applied.

B. The tower base plate shall:

1. Be 2.0” above the tower base.

2. Be constructed of 0.75” thick A-36 Structural Steel.

3. Have a 4” diameter center hole for wiring access.

4. Have four 1” holes for anchor bolt attachment.

C. The tower wiring access opening shall:

1. Measure 9”H x 6.75” W.

2. Be located 15” above the base of the tower.

3. Have a flush cover plate that shall:

a. Be constructed of 0.25” thick steel.

b. Be held in place by two 1/4”-20 countersunk, tamper-resistant spanner screws.

D. The tower shall have an opening in the front to accommodate flush mounting an emergency phone. The phone opening shall:

1. Measure 10” H x 6.75” W.

2. Have six self-clinching #10-24 stainless steel threaded nuts to mount the emergency phone.

E. Directly below the tower phone opening, the tower shall have a section with a 30° downward slope from rear to front, spanning the depth of the phone opening to the full tower depth.

F. The tower shall have the word “EMERGENCY” emblazoned on all four sides in 3.25” high reflective white letters. Custom lettering, sizes and colors are available.

G. The tower blue light shall:

1. Be mounted at the top of the tower with three #10-24 tamper-resistant spanner screws.

2. Have a polycarbonate refractor lens assembly with a prismatic pattern to increase visibility at greater distances.

2.03 FUNCTIONALITY

A. Blue Light

1. The blue light shall remain lit at all times.

2. The blue light shall automatically flash 78 times per minute when triggered by the emergency phone.

3. The blue light shall have an illumination rating of 209 lumens (peak).

4. The blue light shall retain 70% of its initial output intensity after 50,000 hours of operation.

B. Faceplate Light

1. The faceplate light shall remain lit at all times.

2. The faceplate light shall have a concealed, ultra-bright LED design.

3. The faceplate light LEDs shall have no less than 50,000 hour lifetime.

2.04 POWER REQUIREMENTS

A. The tower shall be powered by one of the following power sources:

1. 12VDC – Nominal: 9 Watts

2. 24VDC – Nominal: 9 Watts

3. 24VAC – Nominal: 9 Watts

4. 120VAC – Nominal: 9 Watts

2.05 MANUFACTURED UNITS

A. The tower shall be a Talkaphone ETP-MT Emergency Telephone Tower.

PART 3 EXECUTION

3.01 INSTALLATION

A. The Contractor shall carefully follow instructions in documentation provided by the manufacturer to ensure all steps have been taken to provide a reliable, easy-to-operate system.

B. All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation.

C. The tower shall include 24-inch long J-bolts for mounting into a minimum 24” diameter by 36” deep concrete foundation. Depth to vary according to local regulations and other site-specific considerations.

D. The J-bolts shall protrude approximately 5 inches from the surface of the foundation.

END OF SECTION

SECTION 12 93 00
SITE FURNISHINGS

PART 1 GENERAL
BENCH Model: CR-196

1.1 DESCRIPTION

A. Section includes information, materials, and options for products manufactured by Victor Stanley, Inc. All specifications are subject to change. Contact manufacturer for details.

1.2 SUBMITTALS

A. Specifications Drawing: Detail drawing of product including overall dimensions and options.
B. Samples: Various component samples available upon request.
C. Qualifications: Installer must submit evidence of a successful installation history with comparable materials and designs specified.

1.3 DELIVERY, STORAGE, and HANDLING

A. Delivery: Deliver products to site in manufacturer's original, unopened containers and packaging. Upon delivery, examine packages immediately to ensure all products are complete and undamaged.
B. Storage: Store products in a protected, dry area in manufacturer's unopened containers and packaging.
C. Handling: Protect product's finish from damage during handling and installation.

1.4 COORDINATION

Coordinate with site work and other appropriate sections of the Specifications to maintain proper provisions of the work specified.
All site furnishings shall be laid out in the field and approved prior to installation.

PART 2 PRODUCTS

2.1 MANUFACTURER

Victor Stanley, Inc.
P.O. Drawer 330
Dunkirk, MD 20754 USA
Toll Free: (800) 368-2573 (USA & Canada)
Tel: (301) 855-8300 Fax: (410) 257-7579
E-mail: sales@victorstanley.com
Web site: http://www.victorstanley.com

2.2 BENCH

A. Type: Model CR-196 from the Classic Series

2.3 MATERIALS

A. Ductile iron end frames – all ductile iron castings come with a 10-year warranty against breakage; scrolled vertical steel slats are formed from 1/4” x 1-1/2” (6mm x 38mm) solid steel bars; scrolled vertical steel slats are welded to cross members of 1-7/8”(48mm) tubular steel; 1-5/16” (33mm) tubular steel rung used for additional support

2.4 OPTIONS

A. Standard lengths: 4ft (1.2 meters), 6ft (1.8 meters), and 8ft (2.4 meters) (custom lengths available)
B. Armrest(s)
C. Standard Colors: Bronze, Black, Green, Tavern Square Green, Teal, Blue, Burgundy, Red, Gray, White. Available with Optional Metallics: Silver, and Titanium, (custom colors available, including the RAL range).
D. Custom plaques: Engraved cast bronze plaques

2.5 FINISHES

A. All fabricated metal components are steel shotblasted, etched, phosphatized, preheated, and electrostatically powder-coated with TGIC polyester powder coatings. Products are fully cleaned and pretreated, preheated and coated while hot to fill crevices and build coating film. Coated parts are fully cured to coating manufacturer’s specifications. The thickness of the resulting finish coat averages 8-10 mils (200-250 microns).
B. In high salt abusive climates, hot-dip galvanizing before powder coating is available. Hot-dip galvanizing is performed for Victor Stanley, Inc. by an experienced qualified firm to which products are shipped for galvanizing. Hot-dip galvanizing includes an aggressive pre-treatment and immersion in a tank of charged liquid zinc at or around 860°F (460°C). The resulting surface is resistant to rust but has some unevenness resulting from the bonding of the zinc to the steel surface. As a result, the powder-coating surface finish over that galvanized surface may exhibit bumps, unevenness, and may not be as smooth as Victor Stanley, Inc.’s standard finish; this uneven and inconsistent finish is normal for hot-dip galvanizing. Most fabricated metal components and castings can be hot-dip galvanized, please contact manufacturer for details.

PART 3 EXECUTION

3.1 INSTALLATION

A. Clearance for 3/8” (10mm) anchor bolts (anchor bolts not provided by Victor Stanley, Inc.)
B. Mounting: It is not recommended to locate anchor bolts until bench is in place. This Victor Stanley, Inc. product must be permanently affixed to the ground. Consult your local codes for regulations.

3.2 PROTECTION

Protect products prior to installation by having them remain in the manufacturer’s packaging and container.

END OF SECTION

SECTION 12 93 00
SITE FURNISHINGS

PART 1 GENERAL
BIKE RACK Model: BRCS-105

1.1 DESCRIPTION

Section includes information, materials, and options for products manufactured by Secure Site Design, L.L.C. All specifications are subject to change. Contact manufacturer for details.

1.2 SUBMITTALS

Specifications Drawing: Detail drawing of product including overall dimensions and options.
Samples: Various component samples available upon request.
Qualifications: Installer must submit evidence of a successful installation history with comparable materials and designs specified.

1.3 DELIVERY, STORAGE, and HANDLING

Delivery: Deliver products to site in manufacturer's original, unopened containers and packaging. Upon delivery, examine packages immediately to ensure all products are complete and undamaged.
Storage: Store products in a protected, dry area in manufacturer's unopened containers and packaging.
Handling: Protect product's finish from damage during handling and installation.

1.4 COORDINATION

Coordinate with site work and other appropriate sections of the specifications to maintain proper provisions of the work specified.
All site furnishings shall be laid out in the field and approved prior to installation.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Secure Site Design, L.L.C.
P.O. Box 307,
Dunkirk, MD 20754 U.S.A.
Toll Free (USA & Canada): 1-888-ANTI-RAM (888-268-4726)
410-286-3375 : Fax 410-479-0175
info@securesitedesign.com
www.securesitedesign.com

2.2 STEEL BIKE RACK
Type: BRCS-105 from the Cycle Sentry™ Series

MATERIALS
2-3/8" (60mm) O.D. tubular steel
5" (127mm) surface mount flange

2.4 OPTIONS

Colors: Standard: Bronze, Black, Green, Tavern Square Green, Teal, Blue, Burgundy, Red,Gray,White. Available with Optional Metallics: Silver, and Titanium, (custom colors available, including the RAL range).

Mounting: Standard in-ground and Flanged surface

2.5 FINISHES

A. All powder coat finishes are done at Victor Stanley, Inc. (VSI) to match the VSI product line.

B. All fabricated metal components are steel shotblasted, etched, phosphatized, preheated, and electrostatically powder-coated with TGIC polyester powder coatings. Products are fully cleaned and pretreated, preheated and coated while hot to fill crevices and build coating film. Coated parts are fully cured to coating manufacturer's specifications. The thickness of the resulting finish averages 8-10 mils (200-250 microns).

C. In high salt abusive climates, hot-dip galvanizing before powder coating is available. Hot dip galvanizing is performed for Victor Stanley, Inc. by an experienced qualified firm to which products are shipped for galvanizing. Hot-dip galvanizing includes an aggressive pre-treatment and immersion in a tank of charged liquid zinc at or around 860°F (460°C). The resulting surface is resistant to rust but has some unevenness resulting from the bonding of the zinc to the steel surface. As a result, the powder-coating surface finish over that galvanized surface may exhibit bumps, unevenness, and may not be as smooth as Victor Stanley, Inc.'s standard finish; this uneven and inconsistent finish is normal for hot-dip galvanizing. Most fabricated metal components and castings can be hot-dip galvanized, please contact manufacturer for details.

D. All items available hot dip galvanized without powder coating.

PART 3 EXECUTION

3.1 INSTALLATION

A. Mounting:

a. Standard in-ground: It is not recommended to locate footing(s) until bike rack is in place. This Secure Site Design, L.L.C. product must be permanently affixed in the ground. Consult your local codes for regulations.

b. Standard surface: Clearance for 1/2" (13mm) anchor bolts (anchor bolts not provided by Secure Site Design, L.L.C.). It is not recommended to locate anchor bolts until bike rack is in place. This Secure Site Design, L.L.C. product must be permanently affixed to the ground. Consult your local codes for regulations.

3.2 PROTECTION

A. Protect products prior to installation by having them remain in the manufacturer's packaging and container.

SECTION 12 93 00
SITE FURNISHINGS

PART 1 GENERAL
TRASH CAN Model: A-24

1.1 DESCRIPTION

A. Section includes information, materials, and options for products manufactured by Victor Stanley, Inc. All specifications are subject to change. Contact manufacturer for details.

1.2 SUBMITTALS

A. Specifications Drawing: Detail drawing of product including overall dimensions and options.
B. Samples: Various component samples available upon request.
C. Qualifications: Installer must submit evidence of a successful installation history with comparable materials and designs specified.

1.3 DELIVERY, STORAGE, and HANDLING

A. Delivery: Deliver products to site in manufacturer's original, unopened containers and packaging. Upon delivery, examine packages immediately to ensure all products are complete and undamaged.
B. Storage: Store products in a protected, dry area in manufacturer's unopened containers and packaging.
C. Handling: Protect product's finish from damage during handling and installation.

1.4 COORDINATION

A. Coordinate with site work and other appropriate sections of the specifications to maintain proper provisions of the work specified.
B. All site furnishings shall be laid out in the field and approved prior to installation.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Victor Stanley, Inc.
P.O. Drawer 330
Dunkirk, MD 20754 USA
Toll Free: (800) 368-2573 (USA & Canada)
Tel: (301) 855-8300 Fax: (410) 257-7579
E-mail: sales@victorstanley.com
Web site: http://www.victorstanley.com

2.2 LITTER RECEPTACLE

A. Type: Model A-24 from the Seelsites™ Series
B. Patent: This product is covered by one or more of the following U.S. patents D458,431 S; D454,238 S; D441,932 S; D452,760 S; D483,538 S; D487,537 S; D487,538 S; D487,177 S, Canadian patents 88734; 96040 and the optional lock box U.S. patent 6,339,944 B1.

2.3 MATERIALS

A. 3/8” x 1” (10mm x 25mm) vertical solid steel bars; 1/4” x 2” (6mm x 51mm) horizontal solid steel band; 3/8” x 3” (10mm x 76mm) steel support bars; 16 gauge steel dome; 1” x 1” (25mm x 25mm) solid steel dome support; 1/4” x 1” (6mm x 25mm) solid steel dome mount; leveling feet with a 3/8” (10mm) diameter threaded steel shaft. Oil impregnated bronze bushings and stainless steel pivot pins for door movement, standard 3/8” (10mm) solid steel latch assembly or optional patented stainless steel keyed lock assembly.

B. 24 gallon (90 liters) capacity high density plastic liner [weight not to exceed 5 lbs.(2.27 Kg)]

a. Victory Stanley, Inc. plastic inner liners are molded on tooling designed for an owned by Victor Stanley, Inc. They offer maximum capacity and strength with lightweight construction using critical molded ribs, intergral handholds, and high strength materials. This minimizes handeling difficulty and facilitates easy emptying and storage while affording long service life.

2.4 OPTIONS

A. Lids: Shipped with welded canopy dome lid; available with optional welded canopy dome with stainless steel ashtray.

B. Security: Shipped with standard lockable latch; available with optional patented stainless steel keyed lock assembly.

C. Standard colors: VS Bronze, VS Black, VS Green, VS Tavern Square Green, VS Teal, VS Blue, VS Burgundy, VS Red, VS White, VS Gray (custom colors available, including the RAL range.)

D. Custom plaques and decals: Steel plaques in various sizes and pressure sensitive vinyl outdoor decals.

E. Mounting plate: Standard (1) anchor bolt hole; available with optional (3) anchor bolt holes.

F. Available with optional bottom plate cover.

2.5 FINISHES

A. All fabricated metal components are steel shotblasted, etched, phosphatized, preheated, and electrostatically powder-coated with TGIC polyester powder coatings. Products are fully cleaned and pretreated, preheated and coated while hot to fill crevices and build coating film. Coated parts are fully cured to coating manufacturer’s specifications. The thickness of the resulting finish averages 8-10 mils (200-250 microns).

B. In high salt abusive climates, hot-dip galvanizing before powder coating is available. Hot-dip galvanizing is performed for Victor Stanley, Inc. by an experienced qualified firm to which products are shipped for galvanizing. Hot-dip galvanizing includes an aggressive pre-treatment and immersion in a tank of charged liquid zinc at or around 860°F (460°C). The resulting surface is resistant to rust but has some unevenness resulting from the bonding of the zinc to the steel surface. As a result, the powder-coating surface finish over that galvanized surface may exhibit bumps, unevenness, and may not be as smooth as Victor Stanley, Inc.’s standard finish; this uneven and inconsistent finish is normal for hot-dip galvanizing. Most fabricated metal components and castings can be hot-dip galvanized, please contact manufacturer for details.galvanized, lids cannot, please contact manufacturer for details.

PART 3 EXECUTION

3.1 INSTALLATION

A. Clearance for 3/4” (19mm) square anchor bolt hole (anchor bolts not provided by Victor Stanley, Inc.). It is not recommended to locate anchor bolts until receptacle is in place. This Victor Stanley, Inc. product must be permanently affixed to the ground. Consult your local codes for regulations.

3.2 PROTECTION

A. Protect products prior to installation by having them remain in the manufacturer’s packaging and container.

END OF SECTION

SECTION 26 5617

PARKING LOT AND SITE LED LIGHTING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Lighting fixtures, including LED lamps arrangements, drivers, wiring, and lighting controls.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 26 0500: Common Work Results for Electrical.
3. Section 26 0513: Basic Electrical Materials and Methods.
4. Section 26 0526: Grounding and Bonding.
5. Section 26 0519: Low-Voltage Wires.
6. Section 26 0533: Raceways, Boxes, Fittings and Supports.
7. Section 26 0923: Lighting Controls Systems.
8. Section 26 2416: Panel boards and Signal Terminal Cabinets.
9. Section 26 5000: Lighting.
10. Section 26 5200: Emergency Power Systems.
11. Section 31 2323: Excavating and Fill for Utilities
12. Section 32 1313: Site Concrete Work.

1.02 REFERENCES

A. Publications are referenced within the text by their basic designation only. The most current version shall apply.

B. American National Standards Institute (ANSI):

1. ANSI C82.SSL1 – SSL Drivers.
2. ANSI C136.2 - American National Standard for Roadway and Area Lighting Equipment – Luminaire Voltage Classification.
3. ANSI C136.3 – American National Standard for Roadway and Area Lighting Equipment – Luminaire Attachments.
4. ANSI C136.10 – American National Standard for Roadway Lighting Equipment – Locking-Type Photocontrol Devices and Mating Receptacle Physical and Electrical Interchangeability and Testing.
5. ANSI C136.15 – American National Standard for Roadway and Area Lighting Equipment – Luminaire Field Identification.
6. ANSI C136.25 – American National Standard for Roadway and Area Lighting Equipment – Ingress Protection (Resistance to Dust, Solid Objects and Moisture) for Luminaire Enclosures.

7. ANSI C136.31 – American National Standard for Roadway Lighting Equipment – Luminaire Vibration.

C. American Society for Testing and Materials International (ASTM):

1. ASTM A36 – Standard Specification for Carbon Structural Steel.

2. ASTM A595 - Standard Specification for Steel Tubes, Low-Carbon or High-Strength Low-Alloy, Tapered for Structural Use.

3. ASTM D1654 – Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

4. ASTM G35 – Standard Practice for Determining the Susceptibility of Stainless Steels and Related Nickel-Chromium-Iron Alloys to Stress-Corrosion Cracking in Polythionic Acids.

D. Federal Trade Commission (FTC):

1. Green Guides, 16 CFR Part 260, Guides for the Use of Environmental Marketing Claims.

E. Illuminating Engineering Society of North America (IESNA):

1. IESNA DG-13 – Guide for the Selection of Photo controls for Outdoor Lighting Applications.

2. IESNA LM-64 – Photometric Measurements of Parking Areas.

3. IESNA LM-79 – IESNA Approved Method for the Electrical and Photometric Measurements of Solid-Sate Lighting Products.

4. IESNA LM-80 – IESNA Approved Method for Measuring Lumen Maintenance of LED Light Sources.

5. IESNA TM-15 – Luminaire Classification System for Outdoor Luminaires

6. IESNA TM-21 – Projecting Long Term Lumen Maintenance of LED Light Sources.

7. IESNA RP-13 – Nomenclature and Definitions for Illuminating Engineering.

F. National Electrical Manufacturers Association (NEMA):

1. ANSI/NEMA/ANSLG C78.377 – American National Standard for the Chromaticity of Solid-State Lighting Products.
2. NEMA WD 7 – NEMA Guide Publication: Occupancy Motion Sensors.

G. Next Generation Lighting Industry Alliance/Department of Energy:

1. LED Luminaire Lifetime: Recommendations for Testing and Reporting – 1st Edition.

H. Underwriters Laboratories (UL):

1. UL – 1449 – Surge Protective Devices.

1.03 DEFINITIONS

A. Lighting terminology used herein as defined in IESNA RP-16. See referenced documents for additional definitions.

B. Exception: The term “driver” is used herein to broadly cover both drivers and power supplies, where applicable.

C. Clarification: The term “LED light source(s)” is used herein in accordance with IES LM-80 to broadly cover LED package(s), module(s), and array(s).

D. Support Assembly: Means a pole or other support structures, brackets, cross-arms, appurtenances, base, anchorage, and foundation.

1.04 SUBMITTALS

A. List of Materials: Submit a complete list of materials proposed for this section.

B. Shop Drawings: Provide detailed and dimensioned Shop Drawings indicating kind, weight and thickness of materials, method of fitting and fastening parts together, location and number of sockets, size of LED boards and drivers, and complete details of method of fitting suspension and fastening fixtures in place. Provide wiring diagrams for lighting control equipment. Drawings shall contain sufficient information to assemble and install equipment at the Project site without further instructions.

Photometric calculations: Submit calculations with graphic of luminance levels of work and floor planes. Calculations shall comply with IESNA LM-64 recommendations.

C. Performance Reports:

1. Luminaire photometric reports per IESNA LM-79 including: laboratory name, report number, date, luminaire catalog number, luminaire and light source specifications. Report shall contain lumen values in Backlight, Uplight, and Glare (BUG) zones per IESNA TM-15 and roadway type classifications luminous intensity, zonal lumen summary, and iso-footcandle diagrams, as well as documentation that specified standards and tests methods were followed.

D. Certifications:

1. LM 79 report at T=0 and T=6000 hours with a summary table showing the percent lumen output change and percent input power change.
2. Provide LM80 test results to demonstrate L70 life after 6000 hours of test.
3. LM-80 test data for the LEDs at the three temperatures per LM-80. Provide extrapolation data using and exponential decay function to show the output at 50,000 hours. Provide the Ts value from the IESNA LM-79 and where the point fall in relation to the IESNA LM-80 extrapolated data. Interpolate between the LM 80 data for the Ts temperature.
4. Provide safety certification and file number as required for the luminaire family that must be listed, labeled or identified per applicable Electrical Code. Applicable testing bodies are determined by the US Occupational Safety Health administration (OSHA), and include ETL, UL, or another Nationally Recognized Testing Laboratory (NRTL).
5. Report substantiating compliance with IESNA TM-21.

E. Certified Statements:

1. Submit manufacturer’s certified statement indicating that the manufacturer has been in the business of fabricating lighting fixtures for outdoor and general area illumination for a minimum of 10 years.

2. Submit manufacturer’s certified statement indicating that the manufacturer has local service with offices no more than 50 miles from Owner’s central offices.

F. Installation Instructions: Submit manufacturer's written installation instructions for fixtures and accessories.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications: 10 years in the fabrication of lighting fixtures.

B. Listing and Labels: Light fixtures shall be Underwriters Laboratory (UL) or Nationally Recognized Testing Laboratory (NRTL) listed, and in compliance with applicable industry standards and codes. NRTL test laboratories shall be qualified by the DOE and listed in the DOE SSL website.

1.06 WARRANTY

A. Five years on-site replacement material, fixture finish and workmanship. On-site replacement includes transportation, removal, and installation of new products. Finish warranty shall include warranty against failure or substantial deterioration such as blistering, cracking, peeling, chalking or fading.

B. Five years material replacement warranty for defective or non-starting LED source assemblies, drivers, and power supply units (PSU).

C. LED source assemblies, drivers and power supplies that fail to maintain illuminance levels per Article 2.03.E shall be provided with an additional 10 years warranty.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Lighting Fixtures.

The approved fixtures shall be Sternberg MS805_LED as indicated on the plan and in these specifications. The MS805_LED lumninaire is a modern replica of a popular styled octagonal fixture available with (A) or without (B) spikes. The version with spikes measures 17-1/2"W x 38"H. The cast aluminum hinged roof is appointed with a spiked finial. The luminaire has LED light sources with roof mounted, down lighting optics. The Luminaire shall be UL listed in US and Canada.

B. Fitter - Standard
The fitter shall be heavy wall cast aluminum. It shall have an inside diameter opening to attach to 3" pole. When ordered with a Sternberg pole, the fitter shall be attached by set-screw to the pole top.

C. LED's
The luminaire shall use high output, high brightness LED's. They shall be mounted in arrays, on printed circuit boards designed to maximize heat transfer to the heat sink surface. The arrays shall be roof mounted to minimize up-light. The LED's and printed circuit boards shall be 100% recyclable, they shall also be protected from moisture and corrosion by a conformal coating of 1 to 3 mils. They shall not contain lead, mercury or any other hazardous substances and shall be RoHS compliant. The LED life rating data shall be determined in accordance with IESNA LM-80. They shall operate in a -40°C (-40°F) to +50°C (122°F) ambient air temperature range. The High Performance white LED's will have a life expectancy of approximately 100,000 hours with not less than 70% of original brightness (lumen maintenance), rated at 25°C. The High Brightness, High Output LED's shall be 4500K (3500K or 2700K option) color temperature with a minimum of 70 CRI

D. Optics

The luminaire shall be provided with individual, refractor type optics applied to each LED. The luminaire shall provide Type _2__ (2, 3, 3R, 4 or 5) light distribution per the IESNA classifications. Testing shall be done in accordance with IESNA LM-79

E. Electronic Drivers The LED driver shall be U.L. Recognized. It shall be securely mounted inside the fixture, for optimized performance and longevity. It shall be supplied with a quick-disconnect electrical connector on the power supply, providing easy power connections and fixture installation. It shall have overload as well as short circuit protection, and have a DC voltage output, constant current design, 50/60HZ. It shall be supplied with line-ground, lineneutral and neutral-ground electrical surge protection in accordance with IEEE/ANSI C62.41.2 guidelines. It shall be dimmable using a 0-10v signal.

F. For sources over 50w: The driver shall have a minimum efficiency of 90%. The driver shall be rated at full load with THD<20% and a power factor of greater than 0.90. The driver shall contain over-heat protection which reduces output to less than half rating if the case temperature reaches 85°C.

G. For sources under 50w: The driver shall have a minimum efficiency of 88%.

H. Photocontrols
Button Style: On a single assembly the photocontrol shall be mounted on the fixture and pre-wired to driver. On multiple head assembly's the photocontrol shall be mounted in the pole shaft on an access plate. The electronic button type photocontrol is instant on with a 5-10 second turn off, and shall turn on at 1.5 footcandles with a turn-off at 2-3 footcandles. Photocontrol is 120-277 volt and warranted for 6 years.

I. Twist-Lock Style: The photocontrol shall be mounted externally on the fixture and prewired to driver. The twist lock type photocontrol is instant on with a 3-6 second turn off, and shall turn on at 1.5 footcandles with a turn-off at 2-3 footcandles. Photocontrol is 120-277 volt and warranted for 6 years.

J. Warranty Seven-year limited warranty. See product and finish warranty guide for details.

K. Finish Refer to website for details.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Drivers and LED boards shall be permanently labeled with the day of installation with one inch high letters produced with a P-touch or similar permanent labeling system.

B. Standards shall be installed plumb and straight on concrete footings. Concrete requirements and procedures are as specified in Section 32 1313.

C. Emergency light fixtures shall be labeled "Emergency Fixture" with one inch high letters produced with a P-touch or similar permanent labeling system.

3.02 TESTING

A. Check and adjust fixtures for required illumination.

B. Replace defective drivers and LED boards.

C. Test and adjust lighting control equipment for proper operation.

3.03 SPARE PARTS

A. Furnish ten percent spare drivers with a minimum of one spare LED board of each type.

B. Furnish five percent spare motion detectors of each type with a minimum of one spare detector of each type.

3.04 HAZARDOUS WASTE DISPOSAL

A. Hazardous waste disposals shall be handled and disposed of by licensed contractor.

B. Store, remove, transport and dispose of hazardous materials in all accordance with state and federal regulations.

C. Provide Owner with copy of manifest and certificate of destruction.

3.05 PROTECTION

A. Protect the Work of this section until Substantial Completion.

3.06 CLEANUP

A. Remove rubbish, debris, and waste materials from all areas of work each day.

B. Clean fixture surfaces of dirt, cement, plaster and debris. Furnish cleansers compatible with material surfaces being cleaned.

END OF SECTION

SECTION 31 10 00
SITE CLEARING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
1. Removal of vegetation, grass, grass roots, shrubs, tree stumps, trees, upturned stumps, weed growth, tree roots, brush, masonry, concrete, rubbish, debris and other materials.
2. Removal of concrete and bituminous surfaces.
3. Removal of existing fences and gates.

B. Related Requirements:
1. Division 01 - General Requirements.
2. Section 31 2200 - Grading.
3. Section 31 2313 - Excavation and Fill.
4. Section 31 2316 - Excavation and Fill for Pavement.
5. Section 31 2319 - Excavation and Fill for Structures.
6. Section 31 2323 - Excavation and Fill for Utilities.
7. Section 31 2326 - Base Course.
8. Section 32 3113 - Chain Link Fences and Gates.
9. Section 32 9000 - Planting.

1.02 SUBMITTALS

A. Shop Drawings: Submit site plan indicating extent of site clearing.

1.03 QUALITY ASSURANCE

A. Comply with Standard Specifications for Public Works Construction, current edition, as a minimum requirement.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 TREE AND STUMP REMOVAL

A. Remove trees and stumps indicated or required to be removed. Remove trees, together with bulk of roots, to a minimum depth of 4 feet below required grade, and within a radius of approximately 7 feet beyond perimeter of trunk at grade.
B. Fill and compact excavation from tree and stump removal. Fill in 6 inch layers, each compacted to 90 percent of maximum density in accordance with ASTM D1557.
1. Back filling shall not commence until the excavation is inspected and tested.

3.02 CONCRETE AND BITUMINOUS SURFACING REMOVAL

A. Break up and completely remove existing concrete surfacing, curbs, gutters, walks and bituminous surfacing to indicated limits. Cutting shall be performed to a neat and even line with proper tools or a concrete cutting saw. Minimum depth of cut shall be 1 1/2-inch, unless otherwise indicated. Remove concrete broken beyond the indicated limits to the nearest joint or score line and replace with new concrete to match existing.

3.03 FENCING

A. Where existing project site are placed that are intended as site protection, the removal of those fences, when necessary for construction, shall be carefully coordinated with adjacent Contractors and the Owner.

B. Fencing indicated to be removed and not reinstalled shall be completely removed, including footings. Fill and compact excavations.

3.04 CLEANUP

A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 31 22 00
GRADING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
1. General exterior grading, cutting and filling, including grading for building area, paving, planting areas, banks and hillsides.

B. Related Requirements:
1. Division 01 - General Requirements.
2. Section 31 1000 - Site Clearing.
3. Section 31 2313 - Excavation and Fill.
4. Section 31 2316 - Excavation and Fill for Pavement.
5. Section 31 2319 - Excavation and Fill for Structures.
6. Section 31 2323 - Excavation and Fill for Utilities.
7. Section 31 2326 - Base Course.
8. Section 32 9000 - Planting.

1.02 PROJECT REQUIREMENTS

A. General:
1. Fees: Pay as required by authorities having jurisdiction over the area.
2. Bonds: Post as required by authorities having jurisdiction over the area.
3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.
4. Before grading, contact DIG TESS and all other applicable campus, local, and state authorities for information on public buried utilities and pipelines. Retain the services of an underground utility locator for on-site utilities.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials shall conform to requirements specified in this and related sections.

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect and maintain installed stakes until their removal is required for the Work. Provide replacement grade or location stakes lost or disturbed.

B. Install grade stakes and compare to indicated grades. If discrepancies are found between existing grades and grades indicated on Drawings, do not proceed until discrepancies are resolved.

3.02 ROUGH AND FINE GRADING

A. Rough grade area sufficiently high to require cutting by fine grading:

1. Grade area for bituminous surfacing and other paving to the indicated grades, equal to the section of the indicated base and pavement.
2. Slope banks to required finish grades as cut progresses or leave cuts full and finish grade by mechanical equipment to provide grades and soil densities indicated on the Drawings.
3. Rough grade, fill and compact banks beyond indicated finish grades. Finish grade banks and slopes to indicated grades and specified soil densities.
4. Grade Only Areas: In areas not indicated to receive pavement, rough grade to approximate finish grades and then scarify, moisten and roll to obtain required density and indicated finish grades.
5. Tolerances: Finish grades shall be within a tolerance of 0.05 inch per foot above or below grades indicated. Provide an average grade as indicated.

B. Base or Subgrade:

1. After subgrade has been constructed to approximate required grades, scarify to a depth of at least 6 inches:

a. After scarifying, process loosened material to a finely divided condition and adjust moisture content to optimum condition by addition of water, addition and blending of dry suitable material, or by drying of existing material.

b. In areas where there <u>will not</u> be turf, trees, or planting beds, the subgrade material shall be compacted by tamping, sheepsfoot rollers or pneumatic tire rollers. Required relative compaction shall be [90] percent standard proctor minimum for the top 6 inches below subgrade.

c. In areas where there <u>will be</u> turf, trees, or planting beds, the subgrade material shall be placed and allowed to settle so as to meet the finished grades shown on the drawings. Contractor may wet subgrade material in order to hasten the settlement of the soils. Under no case shall heavily compacted soils be placed within areas where there will turf, trees, or planting beds.

c. Install base course in accordance with Section 31 2326 - Base Course.

2. Tolerance of completed grades of base or subgrade shall not vary more than 0.03 inch per foot from grades indicated. Provide an average grade as indicated.

3.03 SHORING

A. Provide shoring as necessary to properly and safely support earth sides of excavations, and existing curbs, sidewalks, gutter, drives and stairs, against movement and collapse.

B. Design and Calculations: Provide in accordance with requirement of OSHA.

C. Remove shoring upon completion of the Work of this section or when no longer needed unless required otherwise by authorities having jurisdiction.

3.04 EXCESS MATERIAL DISPOSAL

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.05 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 31 23 16
EXCAVATION AND FILL FOR PAVING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
1. Excavating, backfill, and compacting for paved areas.
2. Installation of fill materials.

B. Related Requirements:
1. Division 01 - General Requirements.
2. Section 01 4524 - Environmental Import/Export Material Testing.
3. Section 31 1000 - Site Clearing.
4. Section 31 2200 - Grading.
5. Section 31 2323 - Excavation and Fill for Utilities.
6. Section 32 2326 - Base Course.
7. Section 32 0117 - Pavement Repair.
8. Section 32 1216 - Asphalt Paving.
9. Section 32 1313 - Site Concrete Work.

1.02 PROJECT REQUIREMENTS

A. Import and Export of Earth Materials:
1. Fees: Pay as required by authorities having jurisdiction over the area.
2. Bonds: Post as required by authorities having jurisdiction over the area.
3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.

1.03 SUBMITTALS

A. Imported Soils: A geotechnical engineer, retained by the Owner as an Owner Consultant, shall obtain initial product Sample for testing in accordance with the terms of Article 3.05 of this section.

1.04 QUALITY ASSURANCE

A. Comply with Standard Specifications for Public Works Construction, current edition, except as modified herein.
B. Sampling, testing, and certification of imported and/or exported soils shall be performed in accordance with Section 01 4524 - Environmental Import/Export Material Testing.

1.05 PROJECT CONDITIONS

A. Information on Drawings or in soils report does not constitute a guarantee of accuracy or uniformity of soil conditions over the Project site.

B. A copy of the foundation investigation and soils report is available for examination at the Architect's office during regular office hours of Architect.

PART 2 - PRODUCTS

2.01 BASE MATERIALS

A. Concrete Slabs On Grade: Provide "Crushed Aggregate Base "as specified in the Standard Specifications for Public Works Construction, Section 200: "Rock Materials," with ¾ inch maximum size aggregates. Provide 3-inch thick base, unless noted otherwise.
B. Bituminous Surfacing: As indicated on Drawings and specified in Section 31 2326 - Base Course.

2.02 FILL AND BACKFILL MATERIALS

A. Fill and backfill materials shall be previously excavated materials or imported fill material, free of clods and stones larger than 3-inch, foreign materials, vegetable growths, sod, expansive soils, rubbish and debris. Material shall conform to these specified requirements and related sections.
B. Fill material exhibiting a wide variation in consistency and moisture content shall be blended or aerated to stabilize and upgrade the material.
C. Imported Fill Material:
1. Provide suitable materials obtained from Project site excavations for earthwork and fill materials. If excavated materials are not of suitable quality or sufficient quantity, import additional materials as necessary.
2. Imported fill shall be a granular material with sufficient binder to form a firm and stable unyielding subgrade and shall not have more than 60 percent of fines passing 200 mesh sieve. Material shall have a coefficient of expansion of not more than 2 percent from air dry to optimum moisture content and not more than 6 percent from air dry to saturation. Imported material shall be clean and free of rubbish, debris, and toxic or hazardous contaminants. Adobe or clay soils are not permitted.
D. Other Fill Materials: Brick rubble and broken concrete originating from the Project site may be legally disposed of off the Project site or incorporated in fill, if reviewed by a geotechnical engineer, retained by the Owner as an Owner Consultant. Unless otherwise required, no such materials may be imported from outside the Project site.
E. Permeable Backfill:
1. Provide permeable backfill material behind retaining structures consisting of gravel, crushed gravel, crushed rock, natural sands, manufactured sand, or combinations of these materials conforming to the following gradations:

Sieve Size:	Percentage Passing:
3/4 inch (19mm)	100
3/8 inch (10mm)	80 to 100
No. 100	0 to 8
No. 200	0 to 3

2. Those portions of fill material passing a No. 4 sieve shall provide a sand equivalent of at least 60.

3. Provided backing for weep holes shall consist of two cubic feet of aggregate in burlap sacks, securely tied. Aggregate shall conform to requirements for No. 3 concrete aggregate as specified in subsection 200-1.4 of the Standard Specifications for Public Works Construction.
4. Permeable Backfill Alternate Materials: Instead of the materials specified for retaining structures backfill, a drainage matting system, Miradrain by Mirafi, Inc., or equal, may be provided if reviewed by the Architect.

PART 3 - EXECUTION

3.01 SITE PREPARATION

A. Clear the Project site as required in Section 31 1000 - Site Clearing.

3.02 PROTECTION

A. Protect and guard excavations against danger to life, limb, and property as required by, but not limited to, Cal-OSHA regulations.
B. Protect adjacent existing improvements including landscaping against damage.

3.03 EXISTING UTILITY LINES

A. Protect existing utility lines from damage or displacement.
B. Remove conduits or pipes not in service, exposed during Work, unless a minimum cover of 2 feet is provided. Remove concrete, clay or other non-metallic pipe over 8 inches in diameter, unless otherwise indicated.

3.04 EXCAVATION

A. Unclassified Excavations: Comply with the Standard Specifications for Public Works Construction, Section 300: "Earthwork," except as modified herein.

3.05 FILL

A. Unclassified Fill and Compaction: Comply with the Standard Specifications for Public Works Construction, Section 300: "Earthwork," except as modified herein.
B. Provide fill materials as specified in Part 2 - Products. If excavated materials from the Project site are not of required quality or sufficient quantity, import additional materials as necessary.
C. In addition to the requirements of this section, import and/or exported materials shall comply with the requirements of Section 01 4524 - Environmental Import/Export Material Testing. Imported fill materials shall be sampled by a geotechnical engineer, retained by the Owner as an Owner Consultant, for compliance with the requirements of Part 2 of this Section. The geotechnical engineer, retained by the Owner as an Owner Consultant, shall submit samples to a DSA approved independent approved testing laboratory for testing .Initial sampling shall be performed by the geotechnical engineer, retained by the Owner as an Owner Consultant, before importing material to the Project site. Identify the location of the source site in addition to the address, name of the

person and/or entity responsible for the source site. The geotechnical engineer, retained by the Owner as an Owner Consultant, shall obtain both the initial and additional samples from the identified site and shall submit samples to the approved independent testing laboratory for testing.
The geotechnical engineer, retained by the Owner as an Owner Consultant, shall perform additional sampling during import operations. If the total quantity of import is determined to be greater than 1,000 cubic yards of material, one sample shall be obtained and submitted for testing tested for each 250 cubic yards of imported material. If the total quantity of import is determined to be less than 1,000 yards, one sample shall be obtained and submitted for testing for each 100 cubic yards of imported material.
The independent approved testing laboratory shall perform the required tests and report results of tests noting if the tested material passed or failed such tests and shall furnish copies to the Project Inspector, Architect, OAR, Contractor, and others as required. Report shall state tests were conducted under the responsible charge of a licensed State of Texas professional engineer and the material was tested in accordance with applicable provisions of the Contract Documents, CBC, and the DSA. Upon completion of the Work of this section, the independent testing laboratory and geotechnical engineer shall submit a verified report to the DSA as required by CBC.
Bills of lading or equivalent documentation will be submitted to the Project Inspector on a daily basis. Upon completion of import operations, provide the OAR a certification statement attesting that imported material has been obtained from the identified source site.

3.06 INSTALLATION OF MATERIALS

A. Fill or backfill materials shall be installed in horizontal layers of 6 inches, unless otherwise required. Each layer shall be evenly placed and moistened or aerated as necessary. Unless otherwise reviewed by the geotechnical engineer, retained by the Owner as an Owner Consultant, each layer of fill material shall cover the length and width of the area to be filled before the next layer of material is installed. Top surface of each layer shall be installed to an approximate level with a crown or crossfall of at least 1 in 50, but no more than 1 in 20. Provide adequate drainage at all times during construction of the Work of this section.

3.07 COMPACTING

A. Each layer of fill material shall be compacted by tamping, sheepsfoot rollers, or pneumatic-tired rollers to provide specified relative compaction. At inaccessible locations, provide specified compaction by manually held, operated and directed compaction equipment.
B. Unless otherwise indicated, compact each layer of earth fill to a relative compaction of at least 90 percent.
C. When fill materials, or a combination of fill materials, are encountered or provided which develop densely packed surfaces as a result of installation or compacting operations, scarify each compacted layer before installing the next succeeding layer.

3.08 INSPECTION AND TESTING

A. The geotechnical engineer, retained by the Owner as an Owner Consultant, will inspect and test excavations, sample material quality as required in Part 2, and observe installation and compaction of fill materials.

B. The geotechnical engineer, retained by the Owner as an Owner Consultant, will sample imported fill materials from their designated source before delivery to the Project site.

C. Installation of backfill shall be observed by the geotechnical engineer, retained by the Owner as an Owner Consultant.

D. The geotechnical engineer, retained by the Owner as an Owner Consultant, will inspect and test excavation Work before the installation of fill and/or other materials.

E. Compaction: Test compaction in accordance with ASTM D1557, Method C.

3.09 PROTECTION

A. Protect the Work of this section until Substantial Completion.

3.10 CLEANING

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 32 14 15 INTERLOCKING CONCRETE PAVERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete paver units.

B. Bedding and joint sand.

1.2 RELATED SECTIONS

A. Section 32 91 00 – Planting

B. Section 32 84 00 – Planting Irrigation

1.3 REFERENCES

A. American Society of Testing and Materials (ASTM):
1. C 33, Specification for Concrete Aggregates.
2. C 136, Method for Sieve Analysis for Fine and Coarse Aggregate.
3. C 140, Sampling and Testing Concrete Masonry Units.
4. C 144, Standard Specification for Aggregate for Masonry Mortar.
5. C 936, Specification for Solid Interlocking Concrete Paving Units.
6. C 979, Specification for Pigments for Integrally Colored Concrete.
7. D 698, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 5.5-lb (2.49 kg) Rammer and 12 in. (305 mm) drop.
8. D 1557, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 10-lb (4.54 kg) Rammer and 18 in. (457 mm) drop.
9. D 2940, Graded Aggregate Material for Bases or Subbases for Highways or Airports.

1.4 SUBMITTALS

A. Submit product drawings and data.

B. Submit full size sample sets of concrete paving units to indicate color and shape selections. Color will be selected by Architect/Engineer/Landscape Architect/Owner from manufacturer's available colors.

C. Submit sieve analysis for grading of bedding and joint sand.

D. Submit test results from an independent testing laboratory for compliance of paving unit requirements to ASTM C 936.

E. Indicate layout, pattern, and relationship of paving joints to fixtures and project formed details.

F. Substitutions: Substitutions shall be submitted 10 days prior to bid opening for acceptance.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver concrete pavers to the site in steel banded, plastic banded, or plastic wrapped cubes capable of transfer by fork lift or clamp lift. Unload pavers at job site in such a manner that no damage occurs to the product.

B. Sand shall be covered with waterproof covering to prevent exposure to rainfall or removal by wind. The covering shall be secured in place.

C. Coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving.

1.6 ENVIRONMENTAL CONDITIONS

A. Do not install sand or pavers during heavy rain or snowfall.

B. Do not install sand and pavers over frozen base materials.

C. Do not install frozen sand.

PART 2 - PRODUCTS

2.1 CONCRETE PAVERS

A. Concrete pavers shall be supplied by BELGARD, or approved manufacturer.
Contact: Jewell Concrete, (254) 772-3440 in Waco, Texas

B. Product used shall be as shown on the drawings. Provide color submittals for approval prior to ordering, as site may require specific color blending.

C. Pavers shall meet the following requirements set forth in ASTM C 936, Standard Specification for Interlocking Concrete Paving Units:

1. Average compressive strength of 8,000 psi (55 MPa) with no individual unit under 7,200 psi (50 Mpa).

2. Average absorption of 5% with no unit greater than 7% when tested in accordance with ASTM C 140.

3. Resistance to 50 freeze-thaw cycles when tested in accordance with ASTM C 67.

4. Pigment in concrete pavers shall conform to ASTM C 979.

5. Material shall be manufactured in individual layers on production pallets.

6. Materials shall be manufactured to produce a solid homogeneous matrix in the produced unit.

2.2 VISUAL INSPECTION

A. All units shall be sound and free of defects that would interfere with the proper placing of unit or impair the strength or permanence of the construction.

B. Minor cracks incidental to the usual methods of manufacture, or chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection.

2.3 SAMPLING AND TESTING

A. Manufacturer shall provide access to lots ready for delivery to the Owner or his authorized representative for testing in accordance with ASTM 936-82 for sampling of material prior to commencement of paver placement.

B. Manufacturer shall provide a minimum of three (3) years testing backup data showing manufactured products that meet and exceed ASTM 936-82 when tested in compliance with ASTM C-140.

C. Sampling shall be random with a minimum of nine (9) specimens per 20,000 sq. ft. per product shape and size with repeated samples taken every additional 20,000 sq. ft. or a fraction thereof.

D. Test units in accordance with ASTM for compressive strength, absorption and dimensional tolerance. A minimum of three (3) specimens per test required for an average value. Testing of full units is preferred.

2.4 REJECTION

A. In the event the shipment fails to conform to the specified requirements, the manufacturer may sort it, and new test units shall be selected at random by the LANDSCAPE ARCHITECT from the retained lot and tested at the expense of the manufacturer. If the second set of test units fails to conform to the specified requirements, the entire lot shall be rejected.

2.5 EXPENSE OF TESTS

A. The expense of inspection and testing shall be borne by the GENERAL CONTRACTOR.

2.6 BEDDING AND JOINT SAND

A. Bedding and joint sand shall be clean, non-plastic, free from deleterious or foreign matter. The sand shall be natural or manufactured from crushed rock. Limestone screenings or stone dust shall not be used. When concrete pavers are subject to vehicular traffic, the sands shall be as hard as practically available.

B. Grading of sand samples for the bedding course and joints shall be done according to ASTM C 136. The bedding sand shall conform to the grading requirements of ASTM C 33 as shown in Table 1.

Table 1
Grading Requirements for Bedding Sand

ASTM C 33	
Sieve Size	Percent Passing
3/8 in. (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (600 µm)	25 to 60
No. 50 (300 µm)	10 to 30

No. 100 (150 µm) 2 to 10

C. The base material shall be a road-base type caliche mix, evenly laid with a 95% min. Proctor density rating. Base material shall be free of stones larger than 1.5” diameter, trash, or debris.

D. All sand used for sweeping into joints after paver installation shall be Polymeric Sand specifically manufactured and packaged for the paving industry.

PART 3 EXECUTION

3.1 EXAMINATION

During and after installation, the Landscape Architect and/or Architect will:

A. Verify that subgrade preparation, compacted density and elevations conform to the specifications. Compaction of the soil subgrade to at least 95% Standard Proctor Density per ASTM D 698. Stabilization of the subgrade and/or base material may be necessary with weak or saturated subgrade soils. The Landscape Architect/Architect will inspect subgrade preparation, elevations, and conduct density tests for conformance to specifications.

B. Verify that geotextiles, if applicable, have been placed according to specifications.

C. Verify that aggregate base materials, thickness, compaction, surface tolerances, and elevations conform to the specifications.

D. Verify location, type, installation and elevations of edge restraints around the perimeter area to be paved.

E. Verify that base is dry, uniform, even, and ready to support sand, pavers, and imposed loads.

F. Beginning of bedding sand and paver installation means acceptance of base and edge restraints.

3.2 INSTALLATION

A. Spread the sand evenly over the base course and screed to a nominal 1 in. (25 mm) thickness, not exceeding 11/2 in. (40 mm) thickness. The screeded sand should not be disturbed. Place sufficient sand to stay ahead of the laid pavers. Do not use the bedding sand to fill depressions in the base surface.

B. Ensure that pavers are free of foreign materials before installation.

C. Lay the pavers in the pattern(s) as shown on the drawings. Maintain straight pattern lines.

D. Joints between the pavers on average shall be between 1/16 in. and 3/16 in. (2 mm to 5 mm) wide.

E. Fill gaps at the edges of the paved area with cut pavers or edge units.

F. Cut pavers to be placed along the edge with a masonry saw. No mechanical cuts or breaks can be used for edge treatments.

G. Use a low amplitude, high frequency plate vibrator to vibrate the pavers into the sand. Use Table 3 below to select size of compaction equipment:

Table 3

Paver Thickness	Minimum Centrifugal Compaction Force
60 mm	3000 lbs. (13 kN)
80 mm	5000 lbs. (22 kN)

H. Vibrate the pavers, sweeping dry joint sand into the joints and vibrating until they are full. This will require at least two or three passes with the vibrator. Do not vibrate within 3 ft. (1 m) of the unrestrained edges of the paving units.

I. All work to within 3 ft. (1 m) of the laying face must be left fully compacted with sand-filled joints at the completion of each day.

J. Sweep off excess sand when the job is complete.

K. The final surface elevations shall not deviate more than 3/8 in. (10 mm) under a 10 ft. (3 m) long straightedge.

L. The surface elevation of pavers shall be 1/8 in. to 1/4 in. (3 to 6 mm) above adjacent drainage inlets, concrete collars or channels.

M. The resanding as necessary of paver joints shall be accomplished by contractor for a period of 90 days after completion of work.

3.3 FIELD QUALITY CONTROL

A. After removal of excess sand, final elevations will be checked for conformance to the drawings.

END OF SECTION 32 14 15

SECTION 32 84 00
LANDSCAPE IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 SUBMITTALS

A. A complete listing of all manufacturers, products, model numbers, and designs proposed for use in this scope of work shall be required.

A. Maintain two (2) current copies of all shop drawings showing locations of underground piping, wires, sleeves, valves, ect. for easy and quick reference by anyone inspecting the project site. Copies should show location as well as the exact sizing of irrigation lines, valves, and wiring components.

1.2 RELATED DOCUMENTS AND QUALITY ASSURANCE

A. All work done in accordance with all applicable ordinances of the State of Texas, the City of Wichita Falls, and Midwestern State University.

B. Any and all permits, licenses, etc., or other requirements shall be supplied by the Texas licensed Landscape Irrigator. Applicable provisions of conditions of the contract and special conditions govern this work.

C. It is the intent of the drawings and specifications that the sprinkler system works as set out herein shall constitute a totally complete system serving all areas as set on the drawings. In the event of any omission, or if cause for doubt should arise in connection with the description, the inclusion or exclusion of any required item or items, bidders shall request clarification from the Owner and obtain same to establish total understanding of all requirements. The submission of bid will be construed as evidence that the Contractor understands clearly and fully all requirements of the work.

1.3 DESCRIPTION OF WORK

The drawings on which these specifications are based are generally diagrammatic and indicative of the irrigation system to be installed. Due to the scale of drawing, it is not possible to indicate all offsets, fittings, and sleeves, which may be required to meet site conditions. The Contractor shall not willfully install the irrigation system as shown on the drawings when it is obvious in the field that obstructions, additions, or differences would cause the designed system to be ineffective. Differences should be brought to the Owner, who will make any necessary changes. This work shall be considered incidental to the project. In the event that this notification is not performed, the Contractor shall assume full responsibility for any revisions necessary.

The furnishing and installing of the sprinkler components as shown on the plans, ready for operation, shall include but not be limited to the following:

A. All piping, trenching sleeves, remote electric valves, controllers, anti-siphon devices, etc., installed as shown on the plans and required to provide distribution of water to all sprinkler heads indicated and/or specified.

B. All sprinkler heads installed as specified and as shown on the plans as required to provide adequate controlled water to all areas.

C. All booster pumps and accompanied skids, plumbing, wiring, ect. necessary to provide the pumping and hydraulic requirements necessary as specified on the drawings and in these specifications.

D. All electrical material, telephone or cable connections and labor required to connect primary electrical service and control modules.

1.4 WORK BY OTHERS

A. The Contractor will be responsible for providing a licensed electrician to connect any controller to the site's power source.

1.5 DEFINITIONS

A. "Sprinkler Mains" are the portion of piping from water source to operation valves.

B. "Lateral Piping" is that portion of the piping from the operating valves to the sprinkler heads.

C. "Re-use Lines" refer to existing or proposed piping that carries treated, non-potable water.

1.6 SUBSTITUTIONS

Material shall be as specified. The Owner has standardized the campus to Hunter Irrigation Products. To ensure compatibility, all components must be Hunter products. Substitutions must have the approval of the Owner in writing prior to bid opening and installation.

1.7 SHOP DRAWINGS AND SAMPLES

The Contractor is to provide shop drawings and samples as necessary to identify materials and layout of said materials. By submitting shop drawings and samples, the Contractor thereby represents that it has determined and verified all field measurements, field construction criteria, materials and similar data, or will do so; that it has checked and coordinated each Shop Drawing and Sample with requirements of the work and of the Contract Documents.

1.8 AS-BUILT AND ENGINEERED DRAWINGS

The Contractor is to provide “As-Built” Drawings on reproducible plans furnished as provided by the Owner. Information to be included will be: “As installed” dimensional locations from permanent fixed points, such as building walls or corners, sidewalks, curbs, etc. Drawings should show actual measurements from fixed points to locations of system components, such as electric valves, quick couplers, mainlines, heads, and control boxes. Dimensions are to be recorded on the drawings so that maintenance personnel can locate and service these items. Engineered

shop drawings shall be provided by the Contractor for the pump station configuration. These drawings may be prepared by the manufacturer of the pumping equipment as noted under Section 2.7 of these specifications.

PART 2 - MATERIAL SPECIFICATIONS

2.1 POLYVINYL CHLORIDE PIPE

Polyvinyl chloride pipe (PVC) shall have been manufactured in accordance with the standards as follows:

A. All mainlines 3” or larger shall be Gasketed Schedule 40 pipe, all mainlines below 3” shall be solvent welded Schedule 40 pipe, and all laterals shall be minimum SDR-21 (Class 200) specification.

2.2 PIPE FITTINGS

A. All PVC fittings shall be Schedule 40 solvent weld type, which are compatible to PVC pipe. All fittings shall conform to ASTM #D24464 and D264 for plastic pipe fittings.

B. When taps involve transit lines located on campus, Schedule 80 fittings should be used.

C. Schedule 80 fittings should be used on all 4” x 4” x 2” tees. All fittings of the following configurations shall be ductile iron push-on fittings: 90’s, 45’s, 22’s, and 4” x 4” x 4” tees.

D. All solvent shall conform to ASTM #D2564 solvent cement for PVC pipe and fittings.

2.3 VALVE INSTALLATION

Electric remote valves shall be supplied in accordance with the size and specifications shown in the plan. All valves are to be 100 series Irritrol Century valves with purple NP solenoids and omni regs installed. Remote control valves shall be solenoid-operated, diaphragm, global type with 150 psi CWP rating, having IPS threads and suitable for underground burial without protection.

A. Valves shall be installed in level position. Valves shall be installed deep enough so that there will be a minimum of 12" of cover over the valve.

B. DBY wire connectors shall be used on all valves.

C. Manufacturer's specifications and installation instructions for the valve supplied shall become a part of these specifications.

D. A heavy-duty design valve box will be installed over each valve. The box shall be of heavy gauge plastic construction and have a lockable type lid. All valve boxes are to be jumbo with purple non-potable lids. The box will be installed so that the top is level with grade.

2.4 AUTOMATIC CONTROLLERS

The system shall be controlled by a wall mounted self-contained electrical irrigation controller. Required controller shall be a Hunter controller equivalent to an ESP-SAT RainBird 40-station controller (ICC2 with metal cabinet) with a minimum of 110% of the stations needed on the plans and must match all other clocks on campus for future automated controls. All controllers need to be able to communicate with the University's Central Control Station, and the necessary cable or phone lines required for this capability shall be included in this project scope.

2.5 TECHLINE DRIP IRRIGATION

Techline shall consist of nominal sized one-half inch (½") low-density linear polyethylene tubing with internal pressure compensating, continuously self-cleaning, integral drippers at a specified spacing, (12", 18", or 24" centers) or blank tubing without drippers. The tubing shall be brown in color and conform to an outside diameter (O.D.) of 0.66 inches and an inside diameter (I.D.) of 0.56 inches. Individual pressure compensating drippers shall be welded to the inside wall of the tubing as an integral part of the tubing assembly. These drippers shall be constructed of plastic with a hard plastic diaphragm retainer and a continuously self-flushing elastomer diaphragm capable of flushing any dirt or debris that may enter the dripper, extending the full length of the dripper. The dripper shall have a built-in physical root barrier whereby the water shall exit the dripper from a point different than where it shall exit the tubing. This physical barrier shall create an air gap inside the tubing.

A. Each dripper shall have the ability to independently regulate discharge rates, with an inlet pressure between seven to seventy (7 - 70) pounds per square inch (psi), at a constant rate of flow and with a manufacturer's coefficient of variability (Cv) of 0.03 or less. Recommended operating pressure shall be between 15 - 50 psi. The dripper discharge rate shall be 0.4, 0.6, or 0.9 gallons per hour (GPH) utilizing a combination turbulent flow/reduced pressure compensation cell mechanism and a diaphragm to maintain uniform discharge rates. The drippers shall be capable of continuously cleaning themselves while in operation. The dripper line shall be available with 12", 18", and 24" spacing between drippers unless otherwise specified. For subsurface installation, Techline pipe shall be placed on the finished soil grade prior to decomposed granite installation. Maximum system pressure shall be 50 psi. Filtration shall be 120 mesh or finer. Bending radius shall be 7". For on-surface or under mulch installations, 6" metal wire staples (TLS6) shall be installed 3'-5' on center, (depending on soil type) and two staples shall be installed over every change-of-direction fitting. Techline shall be a Netafim Model Number as specified on the sealed drawings.

PART 3 - INSTALLATION SPECIFICATIONS

3.1 INSTALLATION, GENERAL

A. Before installation is started, the Contractor shall place a stake where each sprinkler head is to be located in accordance to the drawings. The staking shall be approved in writing by the Owner before installation is started. Should a discrepancy in the plans become apparent at this time, in regard to the location of the areas to be watered, such discrepancy shall be pointed out to the Owner. Work must not proceed until the Owner approves or alters the discrepancy. Should such

changes create extra cost to the Contractor, approval for agreed upon extra compensation must be obtained in writing from the Owner before commencing work.

B. The Contractor is cautioned to provide adequate protection to all individuals that may be using the site. Provide barricades as necessary over holes and trenches and install "Caution" signs in traffic ways.

C. Holes and trenches cannot be left open for more than 24 hours without written permission from the Owner. All holes must be barricaded at all times when open. Trenching shall be done in a manner so as to avoid going under the “drip” or “canopy” line of existing trees on site.

D. All horizontal obstructions, such as street, sidewalks, permanent trails, curbs, etc. will be bored under rather than cut. Location and protection of all above and below-grade utilities shall be solely the Contractor’s responsibility and liability.

E. After head installation, the Contractor shall take all necessary action to adjust the throw radius and direction of each head so as to prevent the head from spraying buildings, over sidewalks, parking lots, ect.. If necessary, change nozzle sizes to accommodate necessary throw.

F. During the course of the installation, the Contractor shall take an and all means necessary to insure that the water supply to the landscapes of the Library and Mesa Building remain operational at all times.

G. The Contractor shall be responsible for the placement of all sleeves necessary for irrigation construction. All sleeves shall be Schedule 40 pvc. All sleeves shall be 6” diameter and capped, flagged, and buried 24” below finished grade. Any pavement span greater than 24” shall receive a sleeve.

3.2 EXCAVATION AND BACKFILL, GENERAL

C. All excavation in this project shall be unclassified and is to include earth, loose rock, rock or any combination thereof. The Contractor shall not be allowed extra compensation should hard soil or rock be encountered on this project.

D. All trenches shall be backfilled with the material removed except where special backfill specifications or certain pipe may specify otherwise. No surplus or discarded material or debris shall be included in the backfill. All excess backfill shall be removed from the campus. All trenches and adjoining areas shall be hand-raked so to leave the grade in as good or better cover-up inspection condition than before installation.

E. All trench backfill shall be flooded and compacted in order to prevent settling.

F. All installed work will be made available for inspection by the Owner’s Inspector before backfill and cover-up may be done.

3.3 FINAL CLEAN-UP

Upon completion of the work and before acceptance and final payment will be made, the Contractor shall clean and remove from the site all surplus and discarded materials and debris.

3.4.1 ELECTRIAL WORK

A. The Contractor is responsible for all electrical work, including booster pump installation, required to satisfy the end result of this project. All wires that are cut while trenching shall be spliced and put in a grey valve box and indicated on as-built drawings. All electrical work must be inspected and approved by the Owner's Inspector. All wire splices shall be DBY or DBR type splices or other as approved by Owner in writing.

3.5 PIPE INSTALLATION

A. General

1. Sprinkler mains shall be installed in an 8" wide trench with a minimum of 24" cover.
2. Lateral piping shall be installed in a 6" wide trench, deep enough to allow for the installation of sprinkler heads and valves as per detailed installation instructions for each item, but in no case shall lateral lines be installed with less than 18" of cover.

B. PVC Pipe

1. All rubbish and rocks shall be removed from the trenches. Pipe shall have a firm, uniform bearing for the entire length of each pipeline to prevent uneven settlement. Pad the trenches with dirt or sand should the soil be extremely rocky.
2. Never lay PVC pipe when there is water in the trench or when the temperature is 40 degrees or below.
3. Piping shall be kept clean and all foreign matter or dirt shall be removed from inside the pipe before solvent welding and after laying of pipe.
4. Water flooding of trenches is required before and during backfill. Tamping of backfill soil shall be done to the satisfaction of the Owner.
5. The Contractor is cautioned to use care in the handling of the pipe. Any pipe that is cracked, dented, or damaged will be discarded and shall not be used on this project.
6. Any PVC fitting larger than 2-1/2" shall have a concrete thrust block installed.

C. PVC Pipe and Fitting Assembly

The Contractor shall use only the solvent supplied and recommended by the manufacturer to make solvent-welded joints. The Contractor shall follow these steps in applying the solvent:

1. Apply an even coat of solvent to the outside of the pipe. Then apply solvent to the inside of the fitting, make sure that the coated area on the pipe is equal to the depth of the fitting socket.

2. Insert pipe into the fitting and turn the pipe 1/4 turn. Check all tees and ells for correct position, then hold joint for 15 seconds so that the pipe is firmly welded to the fitting.

3. Allow 15 minutes set-up time for each welded joint before moving.

4. Where threaded PVC connections are required, use threaded PVC adapters into which the pipe may be welded. Teflon tape only will be used on threads. Absolutely no "pipe dope" will be used.

5. All pipe and fittings 2-1/2" and larger shall be sanded prior to applying solvent. Several PVC joints shall be randomly selected and removed from the piping system for inspection. The number of joints removed shall be dependent on the number of joints found to be not properly bonded.

3.6 HEAD INSTALLATION

A. All soil within a 12" radius of the heads shall be heavily compacted so as to prevent damage to the head or riser.

B. All lines shall be flushed thoroughly prior to the installation of the heads.

PART 4 - WARRANTY AND GUARANTEE

4.1 MATERIALS AND WORKMANSHIP

A. Materials and workmanship shall be fully guaranteed for one (1) year after installation and acceptance of the system. Replacement of defective material or repair of work shall be done at no expense to the Owner during the first year, except for repairs or replacement necessitated by damage not of Contractor’s making.

B. Raising and lowering heads to the proper height, filling trenches that have settled, packing the earth firmly around the heads and quick couplers will be considered part of the warranty work and done at no charge to the Owner for one year after acceptance of the system.

C. The Contractor will provide the Owner with a record drawing showing the dimensional location of all electric valves, wire routes, mainline routes, lateral routes, location of heads, etc.

D. The Contractor shall provide operating instructions and maintenance instructions to the Owner in writing at time of completion.

E. The Contractor will provide service and maintenance manuals on all major items in the installation.

F. Maintenance and guarantee as stated above does not include alterations necessitated by re-landscaping, addition of trees, re-grading, or the addition and changes in walks, walls, driveways, etc.

END OF SECTION

SECTION 32 91 00
LANDSCAPE PLANTING

PART 1 - GENERAL

1.1 SUMMARY

RELATED DOCUMENTS:

A. All work shall be done in accordance with all applicable ordinances of the City of Wichita Falls, Texas, and Midwestern State University.

B. Any and all permits, licenses, ect., or other requirements shall be supplied by the Contractor. Applicable provisions of conditions of the contract and special conditions govern this work.

1.2 DESCRIPTION OF WORK:

The extent of the landscape installation work is shown in the drawings that accompany these documents. Where there is any doubt as to the degree of work to be completed, it is the Contractor's responsibility to contact the Owner or the Landscape Architect in writing in order to clarify the situation. The Contractor will be held responsible for completing all work shown in contract, regardless of cost incurred to his business, if he fails to perform any part of this contract.

1.3 JOB CONDITIONS:

A. Site Examination: The Contractor shall make an examination of the site of the proposed work and completely familiarize himself with the nature and extent of the project. No extra compensation will be allowed for any work made necessary by unusual conditions of obstacles encountered during the process of the work, when conditions or obstacles are readily apparent upon a visit to the site. If there are any discrepancies between the drawings and the actual site conditions, the Contractor shall notify the Owner and the Landscape Architect prior to the submission of bids.

B. Utilities: During execution of the work, utmost care shall be exercised to prevent damage to any utility, structures, or right-of-way. The Contractor shall be responsible for locating and protecting all underground utilities and structures. Any damage to existing utilities and/or structures shall be paid for at the Contractor's expense. If in the course of work, underground utilities are encountered and are in conflict with the Contractor's work, the Contractor shall contact the Owner and the Landscape Architect immediately, and they will recommend necessary adjustments. Changes of this nature are considered incidental to the work and shall not entitle the Contractor to additional compensation.

C. Excavation: When conditions are met below grade that may prove detrimental to the health of the plant material, the Contractor shall immediately notify the Owner and the Landscape Architect. A rock allowance will not be granted on this project.

D. Planting Time: Plant or install materials during normal planting seasons for each type of landscape work required. Should question arise as to the most suitable time for any or all of the plant material to be installed, the Contractor shall present in writing to the Landscape Architect

and Owner justification for postponing installation until stated. It is the Contractor's responsibility to notify the Owner prior to installing any plant material. The Owner has the right to suspend planting of any material for a period of up to 180 days at no additional incurred cost.

1.4 QUALITY ASSURANCE:

A. Experience: The Contractor shall have had a minimum of 3 years previous experience in installing landscapes in the climate in which this installation is taking place. Contractor shall provide the Owner with a list of at least 3 previous jobs that had a similar budget and project scope. Contractor shall provide names, addresses, and phone numbers of clients on these jobs so that the Owner may check references. Contractor shall be insured firm that specializes in landscape work, and shall be fully licensed to perform any or all tasks that require licensure by the State of Texas.

B. Substitutions: When the Landscape Architect is furnished sufficient evidence that a specified plant or product cannot be practically obtained on the market, the Landscape Architect may approve in writing the use of approved alternate material. Any substitutions must be made prior to bid submittals. Substitutions made without written consent of the Landscape Architect will be rejected.

C. Standards: All nursery stock shall conform to or exceed those standards as set forth in the most recent publication of "American Standard for Nursery Stock", as published by the American Association of Nurserymen. Where discrepancies arise as to the common name of a plant versus the scientific name of a plant, the scientific name shall govern.

D. Labeling: All labels shall be removed from materials after inspection by the Landscape Architect or a representative of the Owner.

E. Inspection: The Owner has the option to review, accept, or reject, any or all plant material at any time during the installation. When plant material is rejected, there shall not be any additional cost incurred to the Owner or the Landscape Architect.

F. Transportation, Acceptance, and Delivery: All trees, shrubs, groundcovers, bedding plants, and vines shall be transported to the Contractor's holding yard by a fully enclosed or heavily tarped transport. The Contractor shall contact the Landscape Architect 24 hours before the material arrives. After the material has arrived at the holding yard, the Landscape Architect shall inspect all materials to insure compliance with specifications. Any or all plant material that does not meet the set specifications shall be rejected at this time, and all cost associated with securing new material in a timely basis shall be incurred by the Contractor. After inspection, the Contractor shall carefully coordinate a schedule with the Owner, Landscape Architect, and Contractor for installation. Delivery shall be made to the job site by a fully enclosed or tarped trailer. Plant material cannot be left on the job site overnight, and the Contractor shall not be allowed to leave any holes uncovered at any time other than the actual time of installation. The Contractor shall not be allowed to store any equipment, vehicle, or machinery on the Owner's property at any time during the contract's duration.

1.5 SUBMITTALS:

A. OWNER'S Right to Waive Submittal Formalities: The Owner reserves the right to waive any or all formalities associated with submittals or product quality if it feels that it is in the Owner's best interest.

B. Certification: Submit any and all state and federal certifications stating that the plant materials are free from disease and insects. Submit proof of any and all state or federal certifications or licensing for those individuals whose trades require certification or licensure.

C. Fertilizers: The Contractor shall submit a list of all fertilizers and/or chemicals that will be used on the property. MSDS sheets shall accompany those submitted.

D. Mulch: The Contractor shall submit 1 bag of the specified mulch for approval by the Landscape Architect. The bag shall be the original bag that the product was packaged in, or if in bulk, a copy of product specifications from the manufacturer shall be submitted for approval prior to delivery.

E. Soil Amendments: All soil amendments must be submitted prior to installation in the planting areas. Certification of product source must accompany submittal. If the product is packaged, the package must be the original that the material was shipped in.

F. Soil Samples: The Owner can, at it's expense, test the existing soils on the site and provide a copy of the results to the Contractor.

1.6 PROJECT WARRANTY:

A. The Owner reserves the right to waive all warranties and guarantees if it feels that is in it's best interest to do so. All such notices must be in writing and signed by a representative of the Owner.

B. Trees, Shrubs, and Vines: All trees, shrubs, and vines shall be guaranteed for a period of two (2) years after the date of substantial completion as set forth by the Landscape Architect. Reason for replacement shall include death or unsatisfactory growth. The Contractor is not responsible for replacement if the plant material is deemed to have died as a result of Owner negligence, fire, hail, windstorm, lightning, gas leaks, or abuse or damage by others. In the event a replacement is needed during the year, the Contractor shall notify the Owner prior to the installation. All replacements shall be equal to or better than the quality of the plant materials being replaced. The Owner shall bear no cost whatsoever in replacements. Replacements shall be made during the season deemed most acceptable for plant success by the Landscape Architect.

C. Groundcovers: All groundcovers in containers of 4 inches or less shall be guaranteed for 1 year after the date of substantial completion. Any material that is not performing to the Landscape Architect's expectations during this period shall be replaced at no expense to the Owner.

D. Grass: Grass areas that have been sodded, seeded, sprigged, or hydromulched shall be guaranteed to provide a full and vigorous stand of grass within 90 days after the date of installation. During that time frame, the Contractor shall monitor the condition and maintenance of the growing grass, and shall re-seed, hydromulch, or sprig areas where coverage is not 100%,

as determined by the Landscape Architect. Where, after the 90 day growth period, grass has not germinated and grown to the satisfaction of the Owner, the Contractor shall be required to replace with quality sod, all of those areas in question at no cost to the Owner.

1.7 PRODUCTS:

A. Planting Mix: Planting mix material used for backfilling all planting pits shall be prepared in the following proportions by volume. Entire bed areas do not need preparation, only the area within 3 times the size of the container that the plant was delivered in shall be prepared.

70% Sandy-Loam Topsoil equal to that described under item A.1.2 below.
30% Organic Mulch material as described under item A.1.1 below:

1. Organic Mulch: Soil amendment material as required in the backfill mix shall be 100 percent organic sterile composted material equal to that as manufactured by:

Back to Earth Resources, Inc.
5535 Vale Blvd., Suite 200
Dallas, Texas, 75206 Ph. 800-441-2498

2. Topsoil: Soil shall be a red sandy-loam soil similar in characteristics as existing soil in the area. Soil shall be free of noxious weeds, grass, nutgrass, sterilants or other chemicals, trash, and any other debris or item that may prove detrimental to the overall health of the plant. Soil amendment shall be tilled into the sandy-loam soil at a depth of no less than 14 inches. After installation of plant materials, all beds shall be covered with a minimum of 3 inches of decomposed granite, a sterile hardwood mulch, or an approved equal.

B. Fertilizer: All fertilizer used shall be delivered in bags or containers clearly labeled showing the product's analysis. A mycorrhizal fungi planting inoculant shall be used in all bed areas and around all trees on this project. The guaranteed analysis shall consist of 4% nitrogen, 7% phosphorus, and 4% potassium, plus micronutrients. Fertilizer shall be evenly distributed in all bed areas where plants will be installed at the rate of 25 pounds per 500 square feet prior to the installation of the plant material. Installation should only occur directly in the location of the new plantings, and not in areas of cobblestone. All walks or other concrete areas adjacent to the beds shall be thoroughly swept in order to prevent fertilizer from staining surface when wet. The beds shall then be thoroughly flooded so as to assure water penetration to the base of the plant's root zone. All trees shall receive endo and ecto-mycorrhizal fungi at a rate of 3 oz. per 1" caliper DBH of tree.

C. Decomposed Granite: The work required for the decomposed granite installation includes the furnishing all materials, labor, tools and equipment, and in performing all operations necessary to complete installation of decomposed granite paving areas and related work in accordance with the drawings and specifications and subject to the terms and conditions of the contract or as directed by the Landscape Architect. The areas to receive decomposed granite shall be finished accurately to the grades and cross-sections as shown on the plan. The subsurface material shall be compacted to 95% of maximum density, at optimum moisture, as determined by the A.A.S.H.O. Method T-99-82. The exact amount of all materials shall be determined in the field in order to produce the desired durability, density, and uniformity. Provide a one-quart size submittal for approval. A source for decomposed granite may be found at:

MAG Materials
Phone: 325-251-6684
or
Alamo Stone
Phone: 281-240-4600

1. Clean, hard, durable particles or fragments of .75" minus of a color to be selected by the Owner. Material shall be made from decomposed granite. Fines shall be evenly mixed throughout the aggregate. When produced from gravel, 50% by weight of the material retained on a No. 4 sieve shall have one fractured face.

2. The portion retained on the No. 4 sieve shall have a max. percentage of wear of 50 at 500 revolutions as determined by AASHTO T96-77.

3. The portion passing a No. 40 sieve shall have a max. liquid limit of 25 and a max. plasticity index of 7, as determined by AASHTO T89-81 and AASHTO T90-81, respectively.

4. The decomposed granite shall be free from clay lumps, vegetable matter, and deleterious material.

5. All decomposed granite shall be installed over a permeable geotextile fabric to a minimum of 2.5" in depth (settled).

Grading requirements shall be based on AASHTO T11-82 and T27-82 and shall consist of :

Sieve	Passing	Sieve	Passing
3/8"	100%	No. 30	40-50%
No. 4	95-100%	No. 50	25-35%
No. 8	75-80%	No. 100	20-25%
No. 16	55-65%	No. 200	5-15%

D. POND LEDGE STONE AND BOULDERS: The stone used for the ledge or coping of the pond shall be Hadrian Limestone from Texas Stone Quarries, www.texastone.com. The material shall be sized as shown in the drawing details. All exposed edges shall be "broken" to resemble a natural setting. Exposed flat surfaces shall be quarry "roughbacks", which is the natural exposed surface in the field. Contractor to make every effort to provide a natural settting with placement and edge treatments of the pond and exposed stones. Boulders placed as shown in the drawings shall be a limestone or sandstone and sized as shown on the site plans. All boulder shall be buried to a depth equal to 25% of their total height so as to appear natural in setting. Strapping shall be preferred to cable placement of the stones, as any stone which has disfiguring manmade marks shall be rejected. Contractor to provide photographic submittals of boulders for approval, or shall have the boulders in their place of business for field inspection prior to installation.

1.8 PLANT MATERIALS:

A. Container Grown Plants: All plant materials specified shall be nursery grown stock in containers unless otherwise stipulated. All plants shall be sound, disease free, and shall be no smaller than the specifications set forth in these drawings and documents. Container stock shall have grown in

their containers for at least six (6) months, but no more than two (2) years. Samples must prove that no root bound conditions exist. Field grown plants recently transplanted into containers will not be accepted. All nursery stock shall conform to or exceed those standards as set forth in the most recent publication of "American Standard for Nursery Stock", as published by the American Association of Nurserymen. The specifications in these documents shall be considered to be the ruling guidelines. The following specifications represent quantity, size, and general description.

1.9 PLANTING:

A. Installation of Plant Materials:
After bed preparation has been completed, the Contractor shall lay out the plant material for location approval by the Landscape Architect. After approval, the Contractor shall dig a hole approximately 20% wider than the plant that is to be installed in that location. The hole shall also be approximately the same depth as the plant is placed in it's container. With care, the Contractor shall place the plant in the hole, plumb level, and gently backfill soil into the void around the plant. The soil shall be no higher than the top of the plant's original surface, but the surface shall also not be higher than 1/4 inch above the surrounding grade. The soil shall then be carefully packed around the so that it provides a firm, stable environment for the plant. After such installation, a water hose shall be used to 'water-pack' the soil around the newly installed plant. This will serve to settle the soil and remove all air pockets that may have formed. All trees not in a designated planting bed shall have soil piled up around the exterior of the root ball so as to provide a "dish" of 2 inches high that will allow the tree to water properly. If the tree is to be place in rows, such as the Cedar Elms, then the Contractor shall use any means necessary to assure that the trees are lined up in a straight and uniform manner as shown on the drawings.

B. Seeding and Sodding: In the areas designated as "Lawn" on the drawings, the Contractor shall till the existing soils to a depth of 6" and then rake smooth so as to provide a flat, non-undulating soil base free of clods, weeds, rocks or other materials not appropriate in a typical lawn area. Sod shall not be laid on caliche or similar material brought it for the building pad construction. Where areas are to be sodded, soils shall be non-compacted and generally loose and friable. The Contractor shall lay the sod evenly and at a 90-degree angle from the drip irrigation lines. After installation, the sod shall be wetted and rolled with a sod roller so as to provide a smooth and even surface without ridges, netting, rocks, or bumps. Immediately after installation, a new lawn starter fertilizer such as Fertilome's New Lawn Starter shall be applied at the manufacturer's recommended rates. Watering shall commence within 6 hours after installation of sod. Sod shall not be stored in the parking lots or on any pavement, and must be delivered from the grower's yard within 24 hours of being cut. Installation on the job site must occur within 8 hours after delivery to the site.

C. Watering: After installation, all plant materials shall receive adequate watering to insure they remain healthy and vigorous throughout the project. The Contractor is responsible for providing all methods and materials necessary to insure this takes place. In the event of irrigation system failure during the construction process, plant losses incurred shall not be the responsibility of the OWNER. Where necessary, the Contractor shall move adjacent irrigation heads to within the water dish provided.

D. Pruning: Unless otherwise stated in writing, no plant or tree material shall be pruned prior to installation. However, the Contractor shall, if directed by the Landscape Architect, prune any plant or tree material to the satisfaction of the Landscape Architect.

E. Excavation: The Contractor shall not leave any holes uncovered overnight at any time during the project. The Contractor shall take every measure possible to prevent injury to pedestrians due to excavation or other landscape construction.

PART 2 - PROTECTION OF EXISTING TREES AND SHRUBS:

A. Goal: To protect existing campus trees and shrubs from the negative impacts of construction.

B. Scope: Provide complete protection and maintenance of existing trees and shrubs designated to remain within construction limits.

C. Coordination: Coordinate protection of existing trees and shrubs with other trades to prevent damage to trees and shrubs.

D. Compensation for Damages: If existing trees or shrubs are destroyed, killed, or badly damaged as a result of construction operations, contract sum will be reduced by the amount of assessed damages. The Owner will be responsible for evaluating all damages.

E. Materials: Acceptable tree and shrub protection barricade materials are plastic orange construction fence and steel t-posts.

F. Protection: Protect existing trees and shrubs within construction limits for the following damages:

1. Compaction of root area by equipment, vehicles or material storage.
2. Trunk damage by moving equipment, material storage, nailing, bolting, or painting.
3. Strangling by tying ropes or guy wires to trunks or branches.
4. Poisoning by pouring solvents, gas, paint or other chemicals around roots.
5. Cutting of roots by excavation or ditching without Owner's written permission.
6. Damage of branches by improper pruning without the Owner's written permission.
7. Drought from failure to water or changes in normal drainage pattern.
8. Changes of soil pH by disposal of lime materials such as concrete or plaster.
9. Damage by cutting roots greater than 1 ½" diameter without the Owner's written permission. Excavation and earthwork within protection-zone of trees shall be done by hand unless otherwise permitted in writing by the Owner.
10. Install barricade protection around trees and shrubs with construction limits by utilizing materials listed under the materials heading of this section or other Owner approved materials. Barricade protection will be installed prior to the start of demolition or excavation operations. Barricade protection shall remain in place until construction operation are complete. Barricades shall be installed around the trees to be preserved at ratio of 10" per every caliper inch of trunk measured at breast high (DBH). For example: A live oak tree measuring eight (8) inches diameter at approximately breast height shall have a barricade placed completely around the tree not closer than six (6) feet from the trunk unless otherwise specified by the Owner. Protection zone radius = 0.75 ft. x DBH.

G. Trees and shrubs to be removed shall be the responsibility of the Owner prior to construction operations. The Owner shall tag trees and shrubs to be preserved prior to excavation.

H. As shown on the drawings, some trees may need to be relocated to other areas on the Campus. When this is required, the Contractor shall use a mechanical tree spade to dig the new tree hole, as well as to relocate the existing tree. All standard TAN methods of tree relocation shall be followed to insure the successful transplant. While every method and procedure shall be utilized to insure the survival of the transplanted trees, these trees shall not be included in the guarantee phase of this landscape.

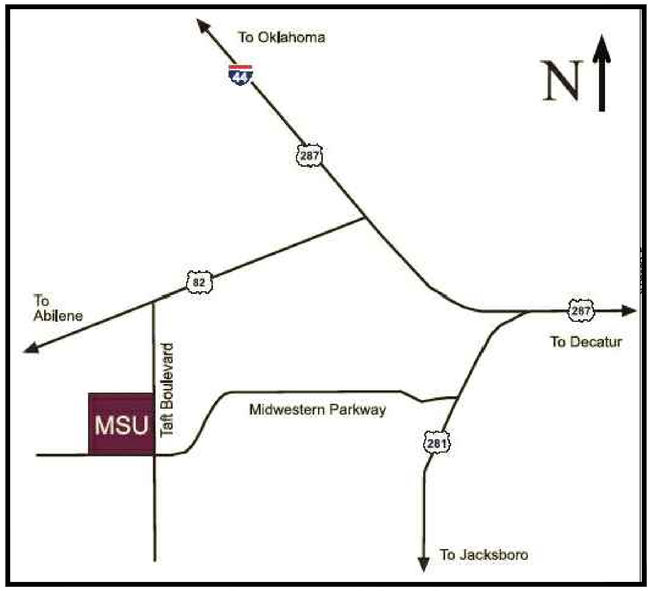
END OF SECTION

MIDWESTERN STATE UNIVERSITY

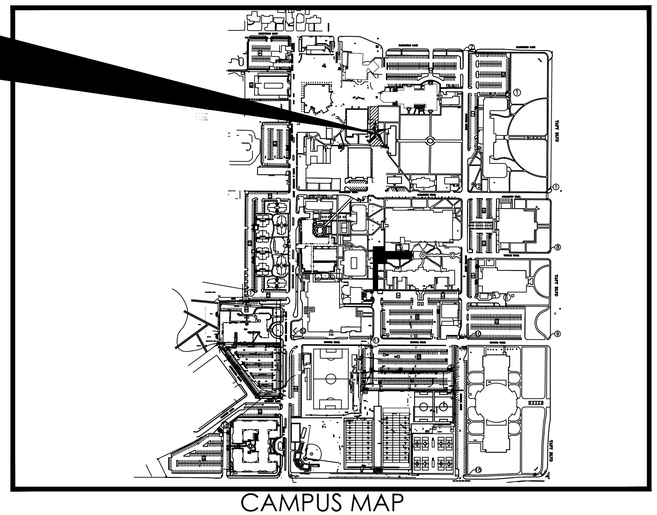
CAMPUS DEVELOPMENT PLAN

MUSTANG WALK-NORTH EXTENSION PLANS

ISSUE FOR BID



GENERAL LOCATION



CAMPUS MAP

SITE PLAN	L-1.0
EXISTING CONDITIONS	L-2.0
SWPPP	L-2.1
DEMOLITION PLAN	L-2.2
HARDSCAPE	L-3.0
DIMENSION PLAN	L-3.1
AMENITIES PLAN	L-4.0
LIGHTING PLAN	L-4.1

SHEET INDEX

PRESIDENT

DR. SUZANNE SHIPLEY

PROVOST

DR. JAMES JOHNSTON

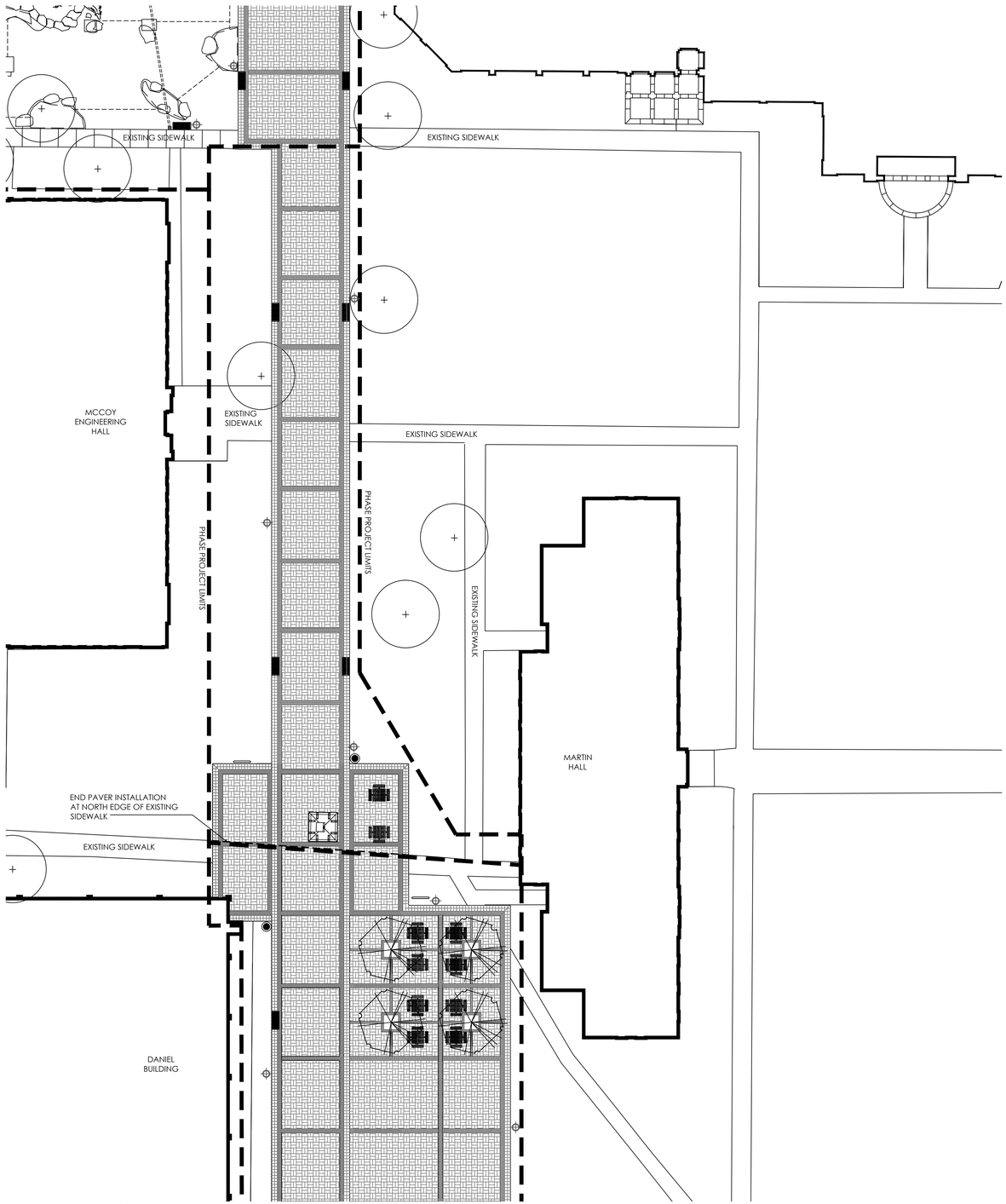
VP FACILITIES SERVICES

KYLE OWEN

REGISTERED LANDSCAPE ARCHITECT
JONATHAN L. H. PRESSLEY
3006
STATE OF TEXAS
3.6.18

KDC Associates
Environmental Planning
Landscape Architecture

4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
Phone: 432.686.8001
Facsimile: 432.683.3487
www.KDCAssociates.com



01 Proposed Site Plan

SCALE: 1" = 20'-0"

0 10 20 40

GENERAL NOTES AND CONDITIONS:

1. VERIFY EXISTING SITE INFORMATION, INCLUDING STRUCTURES, UTILITIES, PROPERTY LINES, LIMITS OF ROADWAYS, AND CURB/GUTTERS, THAT MAY EFFECT THE SCOPE OF WORK PRIOR TO BEGINING SITE CONSTRUCITON.

2. EXISTING UTILITIES ARE INDICATED FOR INFORMATION ONLY AND NOT INTENDED TO SHOW EXACT LOCATION. THE OWNER'S REPRESENTATIVE IS NOT RESPONSIBLE FOR THE LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN OR DETAILED AND INSTALLED BY ANY OTHER CONTRACT. THE CONTRACTOR SHALL LOCATE ALL UTILITIES AND MAINTAIN THE LOCATION DURING ALL PHASES OF THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO UTILITIES OR STRUCTURES AND ANY INJURIES THEREFROM. RESTORATION OF ANY UTILITIES DAMAGED BY THE CONTRACTOR SHALL BE AT THE CONTRACTORS EXPENSE TO THE SATISFACTION OF THE OWNER.

3. THE CONTRACTOR SHALL TAKE ALL NECESSARY STEPS AS REQUIRED TO PROPERLY PROTECT AND MAINTAIN HIS WORK FOR THE DURATION OF THIS CONTRACT. EQUIPMENT SHALL BE REMOVED OR SECURELY AFFIXED TO SITE AT END OF WORK DAY. DAMAGE OR THEFT OF EQUIPMENT IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR, AND ANY INJURY OR OTHER LIABILITY ARISING FROM EQUIPMENT OR MATERIALS LEFT OR STORED ON SITE SHALL SOLELY BE THE RESPONSIBILITY OF THE CONTRACTOR.

4. PROVIDE WRITTEN NOTIFICATION OF ALL DISCREPANCIES BETWEEN EXISTING AND PROPOSED SITE IMPROVEMENTS.

5. ALL WORK SHALL COMPLY WITH ALL APPLICABLE CODES AND ORDINANCES OF THE CITY IN WHICH THE PROJECT IS LOCATED, AND THE STATE OF TEXAS.

6. ANYTHING MENTIONED IN THE TECHNICAL SPECIFICATIONS AND NOT SHOWN ON THE DRAWINGS, OR SHOWN ON THE DRAWINGS AND NOT MENTIONED IN THE TECHNICAL SPECIFICATIONS SHALL BE OF LIKE EFFECT AS IF SHOWN OR MENTIONED IN BOTH. IN CASE OF A DISCREPANCY BETWEEN THE DRAWINGS AND TECHNICAL SPECIFICATIONS, THE MATTER SHALL BE IMMEDIATELY SUBMITTED TO THE OWNERS REPRESENTATIVE. WITHOUT HIS DECISIONS, SAID DISCREPANCY SHALL NOT BE ADJUSTED BY THE CONTRACTOR, SAVE ONLY AT HIS OWN RISK AND EXPENSE.

7. CONTRACTOR SHALL STAKE OUT PLAN TO ITS FULL EXTENT AND SHALL OBTAIN THE APPROVAL OF THE LANDSCAPE ARCHITECT AND OWNER, MAKING MODIFICATIONS AS REQUIRED PRIOR TO PROCEEDING WITH THE WORK.

8. NOTES AND DETAILS ON SPECIFIED DRAWINGS TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.

9. ALL FINISHED GRADES SHALL PROVIDE FOR NATURAL RUNOFF OF WATER WITHOUT LOW SPOTS OR POCKETS. UNLESS SPECIFICALLY DRAWN AND DETAILED, ALL FLOW SHALL BE AWAY FROM ALL STRUCTURES OR PLAYING FIELDS ON SITE, AND SHALL NOT CROSS SIDEWALKS OR OTHER PEDESTRIAN FLOW AREAS.

10. HOLD FINISHED GRADES FOR PLANTING LAWN AREAS 1.5" BELOW TOP OF ADJACENT PAVEMENT. ALL FINISHED GRADES FOR PLANTING BEDS SHALL BE HELD AT 1" BELOW TOP OF ADJACENT PAVEMENT.

11. GRADUALLY ROUND OFF TOPS AND TOES OF ALL PLANTED SLOPES TO PRODUCE A SMOOTH ARCHITECTURAL TRANSITION BETWEEN RELATIVELY LEVEL AREAS AND SLOPES, UNLESS SPECIFICALLY DETAILED IN THE LANDSCAPE GRADING DETAILS.

12. ALL PAVING AREAS IN EXCESS OF 36" IN WIDTH SHALL HAVE LANDSCAPE SLEEVING PROVIDED. ALL SLEEVING SHALL BE A MINIMMUM OF 18" AND A MAXIMUM OF 24" IN DEPTH. SLEEVES SHALL EXTEND A MINIMUM OF 12" BEYOND THE EDGE OF ADJACENT PAVEMENT. SLEEVES SHALL BE CAPPED AND MARKED WITH FLAGS OR STAKES FOR FUTURE IDENTIFICATION. ALL SLEEVES SHALL BE A MINIMUM OF 4" SCH. 40 PVC PIPE IN STANDARD AREAS, AND SHALL BE 6" SCH. 40 PVC PIPE IN AREAS WHERE IRRIGATION MAINLINES ARE MARKED TO CROSS. A MINIMUM OF 2 SLEEVES SHALL BE USED WHENEVER ANY SLEEVING IS NECESSARY.

13. ALL EXISTING TREES AND VEGETATION SHOULD BE CONSIDERED AS REMAINING UNLESS OTHERWISE SPECIFICALLY SHOWN. DO NOT REMOVE ANY TREES WITHOUT SPECIFIC PERMISSION FROM THE LANDSCAPE ARCHITECT. ALL TREES SHALL BE PROTECTED BY A MINIMUM 3' TALL VINYL SNOW FENCE OR SIMILAR BARRIER. FENCING SHALL BE PLACED UNDER THE OUTERMOST EDGE OF THE CANOPY OF THE TREE. NO VEHICULAR TRAFFIC SHALL BE ALLOWED UNDER ANY TREE CANOPY FOR ANY REASON. NO SOLVENTS, THINNERS, PAINT, CONCRETE WASH, OR OTHER MATERIALS SHALL BE DISBURSED UNDER THE CANOPY OF ANY TREE.

14. UNLESS SPECIFICALLY INDICATED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION, MAINTENANCE, AND RESTORATION OF ANY ELECTRICAL, IRRIGATION AND DRAINAGE SYSTEMS ON SITE.

15. CONTRACTOR SHALL TAKE ALL NECESSARY STEPS TO NOTIFY ALL UTILITY COMPANIES PRIOR TO ANY DIGGING, TRENCHING, OR EXCAVATION ON SITE. CONSTRUCTION MAY NOT BEGIN PRIOR TO PROPER AND ACCURATE MARKING OF UNDERGROUND UTILITIES AND SECURING OF ANY AND ALL APPLICABLE PERMITS.

16. THE ELEMENTS WITHIN THIS PROJECT FALL WITHIN THE AMERICANS WITH DISABILITES ACT, AND AS SUCH, ALL SIDEWALKS, GRADES, AND BUILDING ELEMENTS MUST COMPLY.

17. HOLES, TRENCHES, PITS, OR OTHER ELEMENTS WHICH COULD CAUSE FALLS OR OTHER ACCIDENTS SHALL BE FULLY PROTECTED AND MARKED BY THE CONTRACTOR, WHO ASSUMES FULL LIABILITY FOR ANY INJURIES OR DAMAGES CAUSED BY CONSTRUCTION.

18. SPEED AND COORDINATION OF CONSTRUCTION ELEMENTS AND WORK TRADES IS ESSENTIAL FOR THIS PROJECT AND CONTRACTOR SHALL USE ALL NECESSARY METHODS TO IMPLEMENT BOTH.

PROPOSED PAVER PLAZA

KDC Associates
4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
Phone: 432.686.8001
Fax/Info: 432.683.3487
www.KDCassociates.com
Environmental Planning
Landscape Architecture

REGISTERED LANDSCAPE ARCHITECT
STATE OF TEXAS
JONATHAN L. H. PRIESEMEYER
3006
3.6.18

Texas811
Know what's below. Call before you dig.

MIDWESTERN STATE UNIVERSITY

MUSTANG WALK NORTH EXTENSION DEVELOPMENT PLANS

WICHITA FALLS, TX

Date: 12.21.17
Revisions: 1.16.18
3.6.18

Scale: 1"=20'-0"

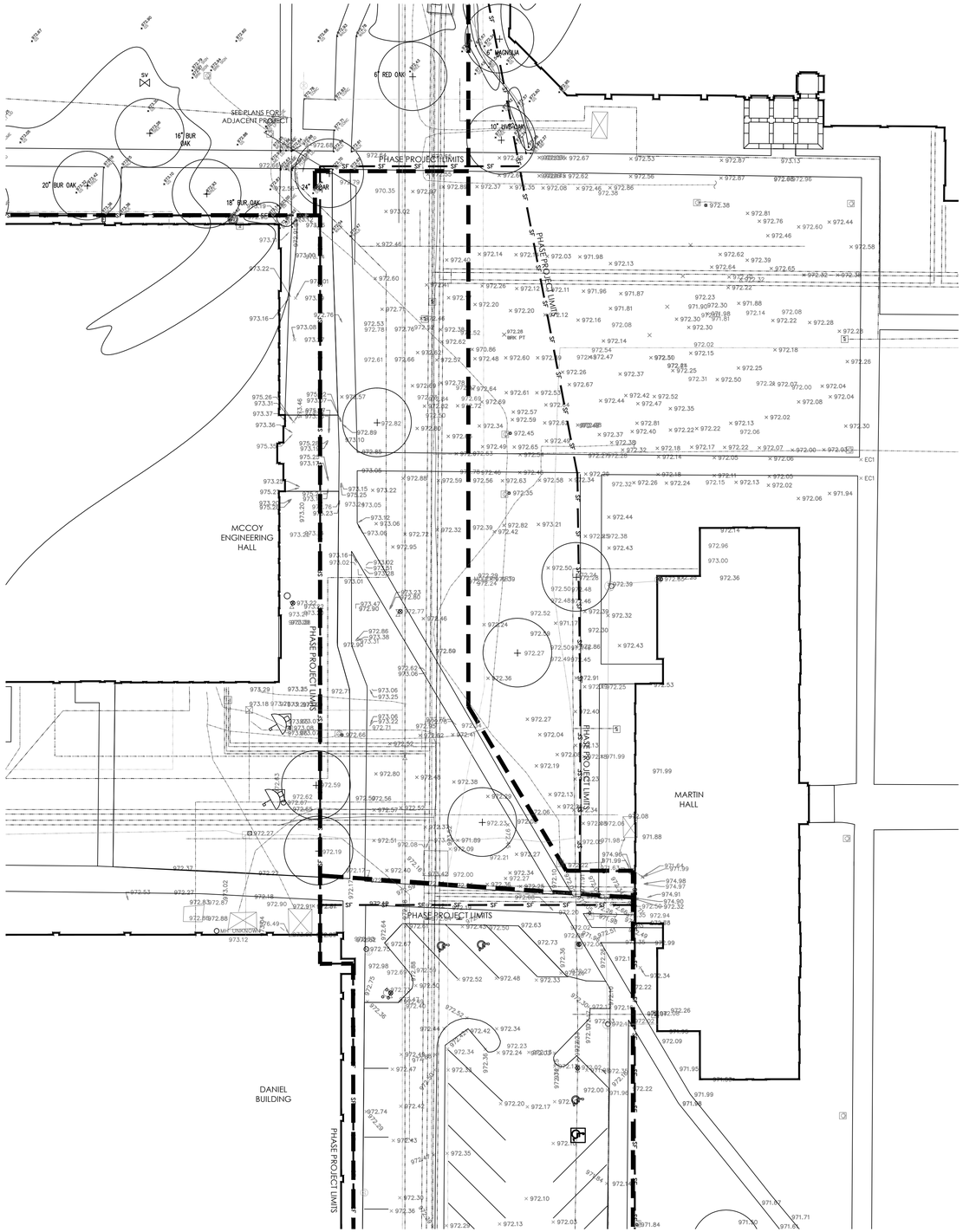
Site Plan

Sheet No.

L-1.0

KEY NOTES:

1. PHASE PROJECT LIMITS



01 Existing Conditions

SCALE: 1" = 20'-0"

0 10 20 40

KDC Associates
4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
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MIDWESTERN STATE UNIVERSITY

WICHITA FALLS, TX

Date: 12.21.17
Revisions: 1.16.18
3.6.18

Scale: 1"=20'-0"

Existing Conditions

Sheet No.

L-2.0

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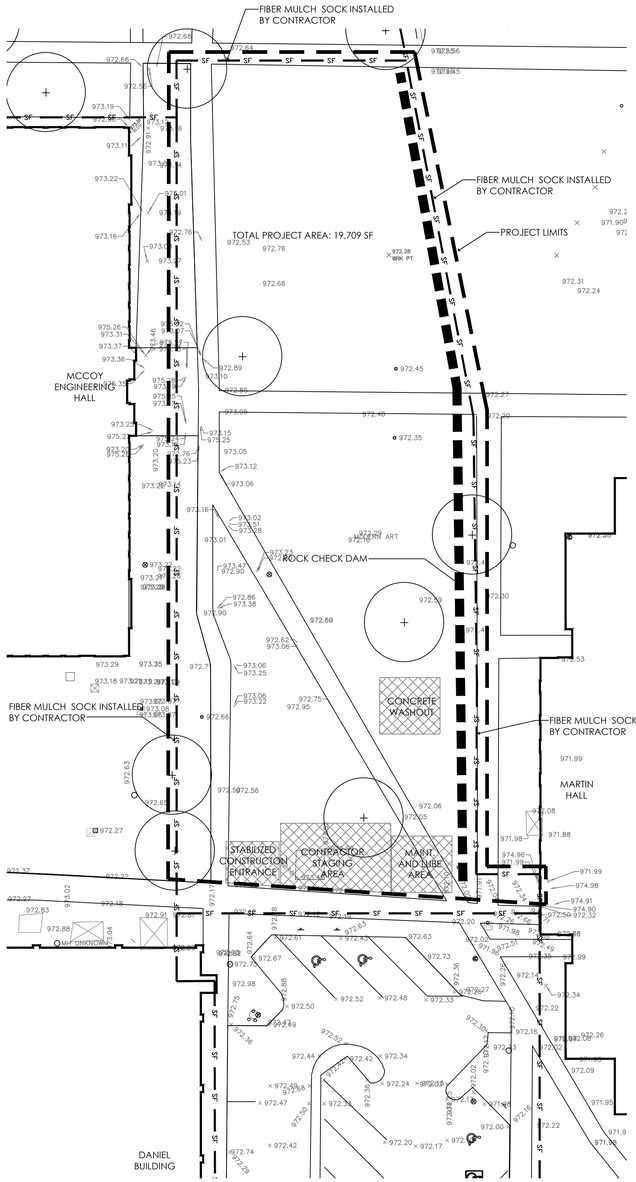

01 SWPPP

SCALE: 1" = 20'-0"

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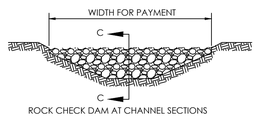
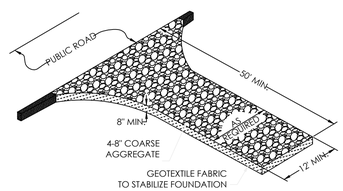


ROCK CHECK DAM AT CHANNEL SECTIONS

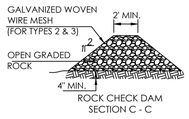
01 Rock Check Dam Details

SCALE: NTS

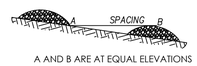


02 Typ. Construction Entrance

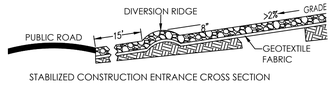
SCALE: NTS



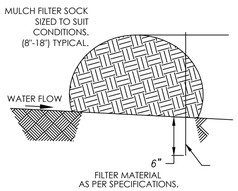
ROCK CHECK DAM SECTION C - C



A AND B ARE AT EQUAL ELEVATIONS

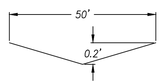


STABILIZED CONSTRUCTION ENTRANCE CROSS SECTION



03 Mulch Filter Sock Detail

SCALE: NTS



04 Interceptor Swale

SCALE: NTS

KEY NOTES:

1. PROPOSED MULCH FILTER SOCK TO BE INSTALLED PRIOR TO BEGINNING CONSTRUCTION

GENERAL SWPPP NOTES:

1. CONCRETE BATCH PLANTS, HOT MIX ASPHALTIC CONRETE PLANTS, AND FILL MATERIAL SOURCES ARE LOCATED AT OFF-SITE FACILITIES.
2. AREAS FOR STAGING CONSTRUCTION TRAFFIC, PARKING, VEHICULAR MAINTENANCE, CONCRETE TRUCK WASHING, AND VEHICLE WASHING SHALL BE WITHIN THE LIMITS OF THE SWPPP PERIMETER CONTROLS. STAGE AREAS TO INCLUDE ALL LOCTATIONS TO BE NOTED BY THE CONTRACTOR, FUEL STORAGE AREA, AND PORTA-TOILET LOCATIONS.
3. THE SWPPP CONTROLS WILL BE INSTALLED BY THE CONTRACTOR, WHO SHALL ALSO FILE ALL NECESSARY TCEQ PERMIT DOCUMENTS (NOI, NOC, NOT).
4. ALL OPERATORS SHALL COMPLY WITH INSPECTION, MAINTENANCE AND REPORTING REQUIREMENTS OF THE GENERAL PERMIT.
5. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 32' OF THE TEMPORARY CONCRTE WASHOUT FACILITY.
6. CONCRETE WASHOUT PLASTIC LINER SHALL BE ANCHORED WITH GRAVEL FILLED BAGS.
7. PLASTIC LINER SHALL BE MIN. 20 MIL THICKNESS.

EROSION CONTROL NOTES:

1. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PHASE OF THE PROJECT ACCORDING TO THE FOLLOWING SCHEDLUE:
   A. FILTER FABRIC (SILT) FENCE OR WADDELS:
      a. ACCUMULATED SEDIMENTS WILL BE REMOVED AS REQUIRED TO KEEP THE BARRIER FUNCTIONAL
      b. ALL UNDERCUTTIN OR EROSION OF THE TOE ANCHOR WILL BE REPAIRED IMMEDIATELY WITH COMPACTED BACKFILL MATERIAL
      c. ADHERE TO ANY MANUFACTUER'S RECOMMENDATIONS FOR REPLACING FILTER FABRIC OR WADDELS DURING CONSTRUCTION
2. SITE INSPECTIONS MUST BE MADE AT LEASTE ONCE EVERY 14 DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT 5" OR GREATER OR AT LEAST EVERY 7 DAYS REGARDLESS OF PRECIPITATION.
3. AS SITE CONDITIONS CHANGE, NECESSARY ADJUSTMENTS WILL BE MADE BY CONTRACTOR/OWNER IN THE FIELD TO REDUCE STORM WATER RUNOFF AS NEEDED. SHOULD THE MEASURES SHOWN HEREON BE INSUFFICIENT TO REDUCE RUNOFF, THE CONTRACTOR/OWNER SHALL BE RESPONSIBLE FOR FIELD ADJUSTMENT TO BE MORE EFFECTIVE FOR RUNOFF.
4. UPON ADJUSTING AND/OR ALTERING SORM WATER POLLUTION PREVENTION MEASURES ONSITE, THE CONTRACTOR/OWNER SHALL BE RESPONSIBLE FOR UPDATING AND REVISING SITE MAP IN A TIMELY MANNER.
5. SHOULD TCEQ OR AN AUTHORIZED AGENCY OF, MODIFY STORM WATER REGULATIONS PRIOR TO THE COMPLETION OF CONSTRUCTION, THE CONTRACTOR/OWNER SHALL BE RESPONSIBLE FOR MAKING NECESSARY MODIFICATIONS TO THE RUNOFF REDUCTION MEASURES IN PLACE IN ORDER TO COMPLY WITH THE MOST CURRENT REGULATIONS.
6. PERIMETER CONTROL MEASURES WILL BE MAINTAINED DURING CONSTRUCTION AND UNTIL THE SITE HAS ACHIEVED 70% NATIVE BACKGROUND VEGETATION.
7. 70% STABILIZATION MAY INCLUDE PAVEMENT AND/OR THE ESTABLISHED LANDSCAPING THAT WILL PREVENT STORM WATER RUNOFF FROM ERODING OR COMPROMISING THE SITE AND DOWNSTREAM DRAINAGE FACILITIES.
8. UPON FINAL STABILIZATION, THE CONTRACTOR/OWNER IS RESPONSIBLE FOR REMOVING TEMPORARY EROSION CONTROL STRUCTURES.

ROCK CHECK DAM NOTES:

1. RIPRAP SIZE FOR ROCK CHECK DAM AND CONCRETE WASHOUT TO BE 4" - 8" CALICHE COURSE AGGREGATE.
2. CHECK DAMS MAY BE USED IN SLOPING DITCHES OR CHANNELS TO SLOW VELOCITY OR TO CREATE SEDIMENT TRAPS.
3. ENSURE THAT THE MAXIMUM SPACING BETWEEN DAMS PLACES THE TOE OF THE UPSTREAM DAM AT THE SAME ELEVATION AS THE DOWNSTREAM DAM.

SILT FENCING NOTES:

1. STEEL POST OR STAKES WHICH SUPPORT THE FENCE OR WADDELS SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE.
2. POST/STAKES MUST BE IMBEDDED 12". THE TOE OF THE BARRIER SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW.
3. SILT FENCE/WADDELS SHALL BE SECURELY FASTENED TO EACH STEEL POST OR STAKE, OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POST.
4. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. SILT FENCE/WADDEL SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE. ACCUMULATED SILT OR DEBRIS SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 6".
6. THE SILT OR DEBRIS SHALL BE DISPOSED OF IN AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITONAL SILTATION.

CONSTRUCTION ENTRANCE NOTES:

1. CONSTRUCTION ENTRANCE TO BE AN 8" MINIMUM DEPTH COARSE AGGREGATE OVER GEOTEXTILE FILTER FABRIC. RIPRAP SIZE TO BE 4" - 8".
2. A CHAIN-ANCHORED 4" STEEL PIPE SHALL BE PLACED WITHIN THE AGGREGATE AT THE ENTRANCE TO THE CONSTRUCTION SITE.

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WICHITA FALLS, TX

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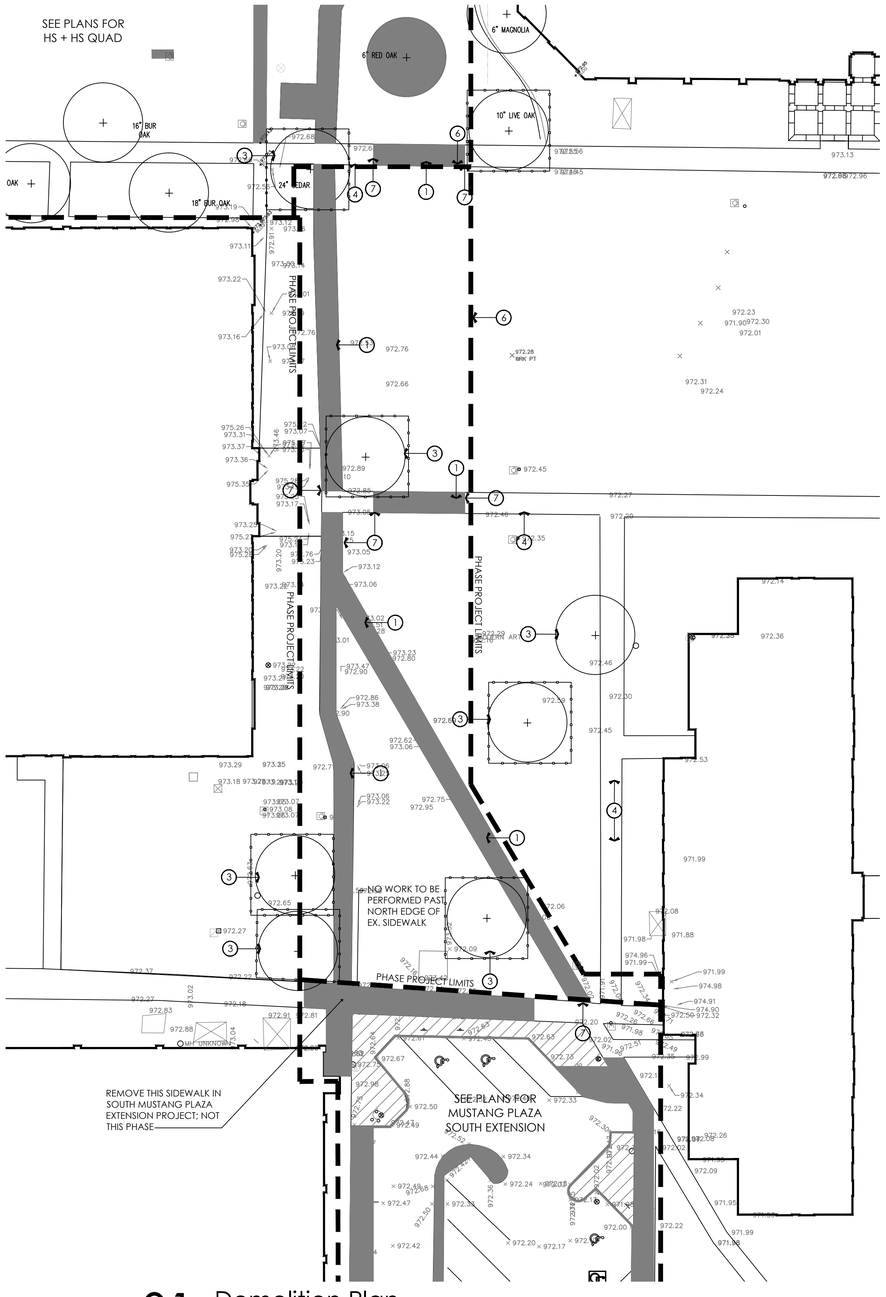
3.6.18

Scale: As Shown

SWPPP

Sheet No.

L-2.1



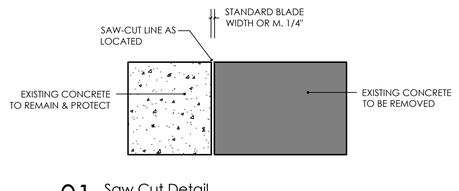
01 Demolition Plan

SCALE: 1" = 20'-0"

0 10 20 40

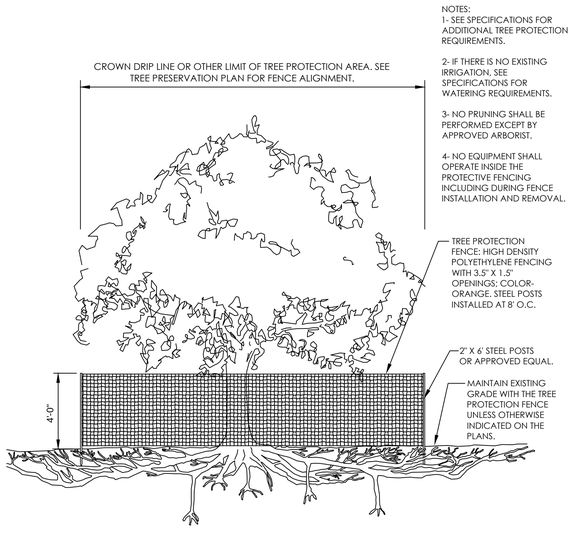
DEMOLITION NOTES:

1. PRIOR TO ANY DEMOLITION, GENERAL CONTRACTOR TO CONTACT ALL EXISTING UTILITY COMPANIES TO LOCATE ALL UTILITIES BY AUTHORIZED PERSONNEL OF UTILITY COMPANIES.
2. PRIOR TO ANY ABONDONMENT OF EXISTING UTILIES, GENERAL CONTRACTOR SHALL CONTACT AUTHORIZED PERSONNEL OF UTILITY COMPANIES FOR COORDINATION AND LOCATION OF UTILITY ABONDONMENT.
3. ALL EXISTING UTILITIES TO BE ABONDONED MAY BE, AT THE DISCRETION OF THE GENERAL CONTRACTOR, COMPLETELY REMOVED OR HAVE PORTIONS REMOVED TO FACILITATE THE INSTALLATION OF NEW UTILITIES. ANY ABONDONED UTILITIES WHICH ARE CUT SHALL BE PERMANENTLY PLUGGED AND CAPPED PER UTILITY COMPANY REQUIREMENTS.
4. IF AN UNMAPPED UTILITY IS LOCATED, THE GENERAL CONTRACTOR SHALL CONTACT MSU SYSTEM CONSTRUCTION MANAGER TO DETERMINE IF IT WILL BE REMOVED OR ABANDONED IN PLACE.
5. GENERAL CONTRACTOR SHALL COORDINATE THE REMOVAL OF ALL WATER LINES WITH MSU.
6. GENERAL CONTRACTOR SHALL RETURN ALL REMOVED LIGHT STANDARDS TO MSU. CONTRACTOR SHALL ALSO PROVIDE INFORMATION ABOUT THE SIZE AND GEOMETRIC PATTERN OF THE ANCHOR BOLTS REMOVED.
7. GENERAL CONTRACTOR SHALL RETURN ALL STOP SIGNS AND POLES TO MSU.



01 Saw Cut Detail

SCALE: NTS



02 Tree Protection Detail

SCALE: NTS

KEY NOTES:

1. REMOVE EXISTING CONCRETE. BRING IN NEW BACKFILL AS NEEDED.
2. EXISTING TREES TO BE REMOVED.
3. EXISTING TREES TO BE PRESERVED IN PLACE.
4. EXISTING CONCRETE SIDEWALK TO REMAIN. SAW CUT (IF NEEDED) AND PROTECT.
5. EXISTING SIGN OR SITE MISC TO BE REMOVED. ALL SIGNAGE SHOULD BE TURNED OVER TO MSU MAINTENANCE.
6. CONSTRUCTION PROJECT LIMITS.
7. SAW CUT CONCRETE TO REMOVE UN-NEEDED PORTION.

REMOVE EXISTING CONCRETE

REMOVE EXISTING SOIL TO BRING TO GRADE

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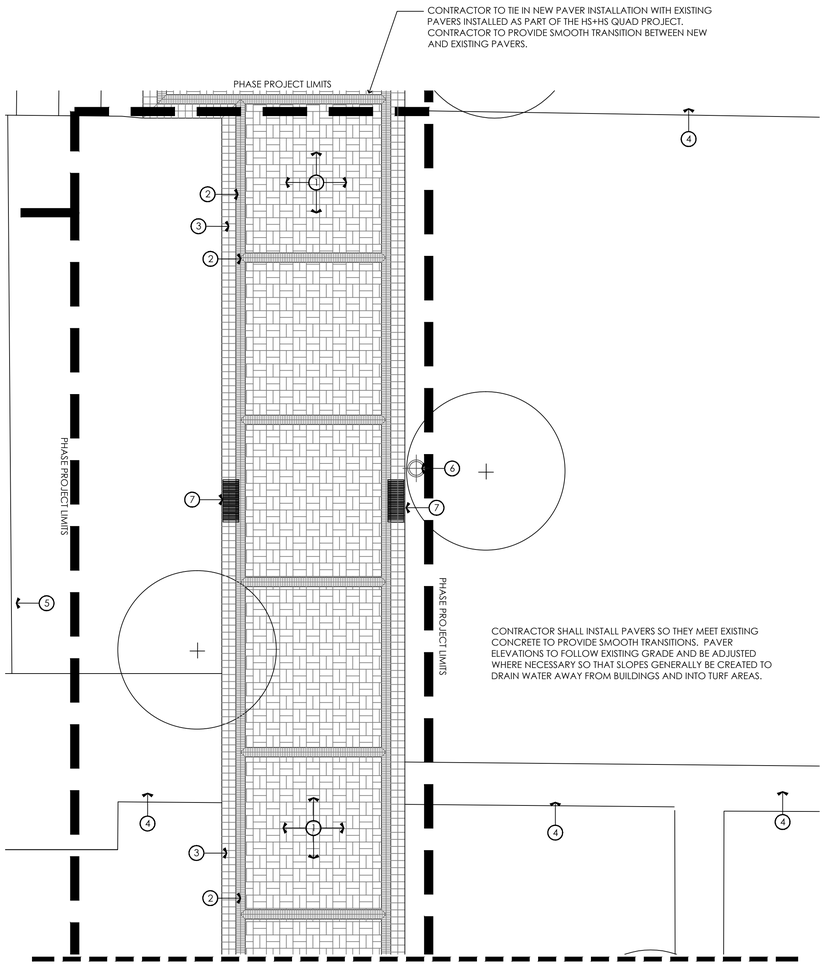
Scale: 1"=20'-0"

Demolition Plan

Sheet No.

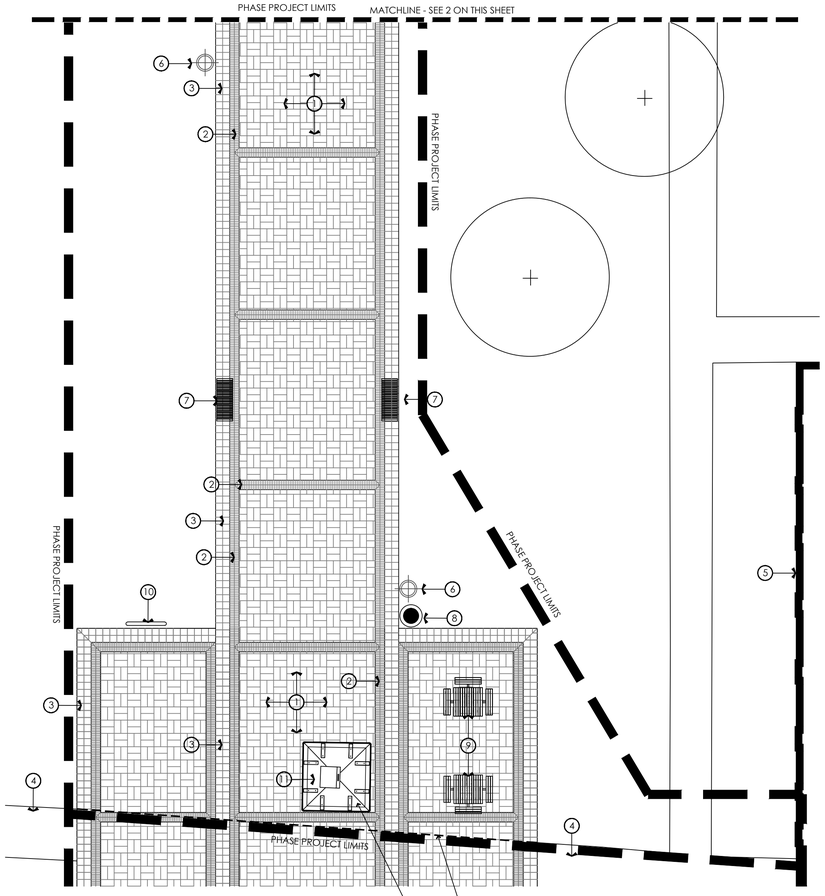
L-2.2



01 Hardscape Plan

SCALE: 1" = 10'-0"

0 5 10 20



02 Hardscape Plan

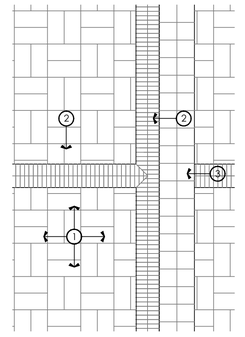
SCALE: 1" = 10'-0"

0 5 10 20

KEY NOTES:

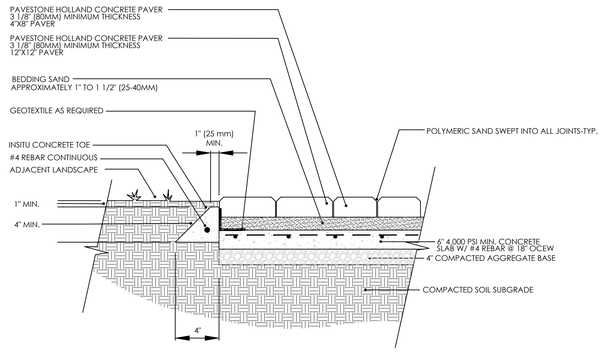
1. PAVER WALKWAY WITH BELGARD OR PAVESTONE 80MM 4" X 8" HOLLAND PAVER IN A BASKET WEAVE PATTERN AS SHOWN (#219). COLOR: ANTIQUE TERRA COTTA; CONTRACTOR TO SUBMIT SAMPLES. (2-3 / L-3.0)
2. DOUBLE ROWLOCK PAVER BAND USING BELGARD OR PAVESTONE 80MM 4" X 8" HOLLAND PAVER (#219). COLOR: CHARCOAL; CONTRACTOR TO SUBMIT SAMPLES. (2-3 / L-3.0)
3. DOUBLE PAVER BORDER USING BELGARD OR PAVESTONE 80MM 12"X12" HOLLAND PAVER (#219). COLOR: PEWTER; CONTRACTOR TO SUBMIT SAMPLES. (2-3 / L-3.0)
4. EXISTING CONCRETE TO REMAIN
5. EXISTING CAMPUS BUILDING
6. TYP. AREA LIGHT. SEE SHEET L-4.0
7. TYP. BENCH. SEE SHEET L-4.0
8. TYP. TRASH RECEPTACLE. SEE SHEET L-4.0.
9. TYP. PICNIC TABLE. SEE SHEET L-4.0
10. TYP. BIKE RACK. SEE SHEET L-4.0
11. EXISTING TUNNEL VENT HATCH (4 / L-3.0)

PROPOSED PAVER PLAZA



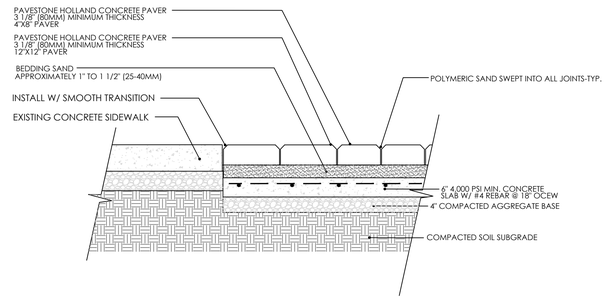
01 Paving Enlargement

SCALE: 1/4" = 1'-0"



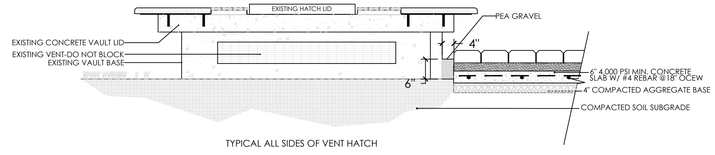
02 Standard Fire Lane Paver W/ Toe Edge

SCALE: NTS



03 Paver Install Adjacent To Ex. Concrete

SCALE: NTS



TYPICAL ALL SIDES OF VENT HATCH

04 Pavers Adjacent to Tunnel Hatch

SCALE: NTS

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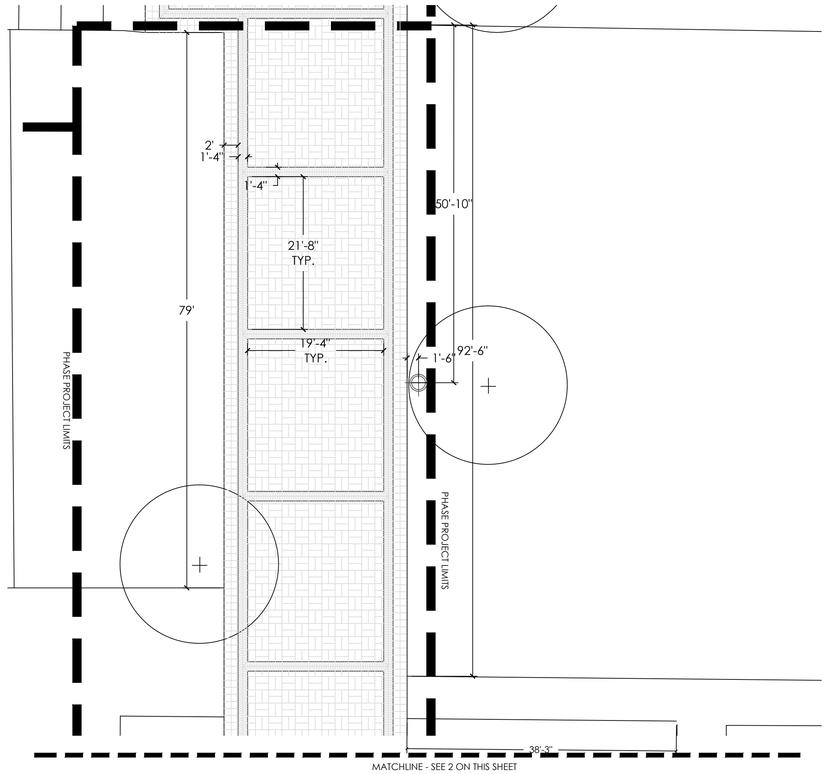
Scale: 1"=10'-0"

Hardscape Plan

Sheet No.

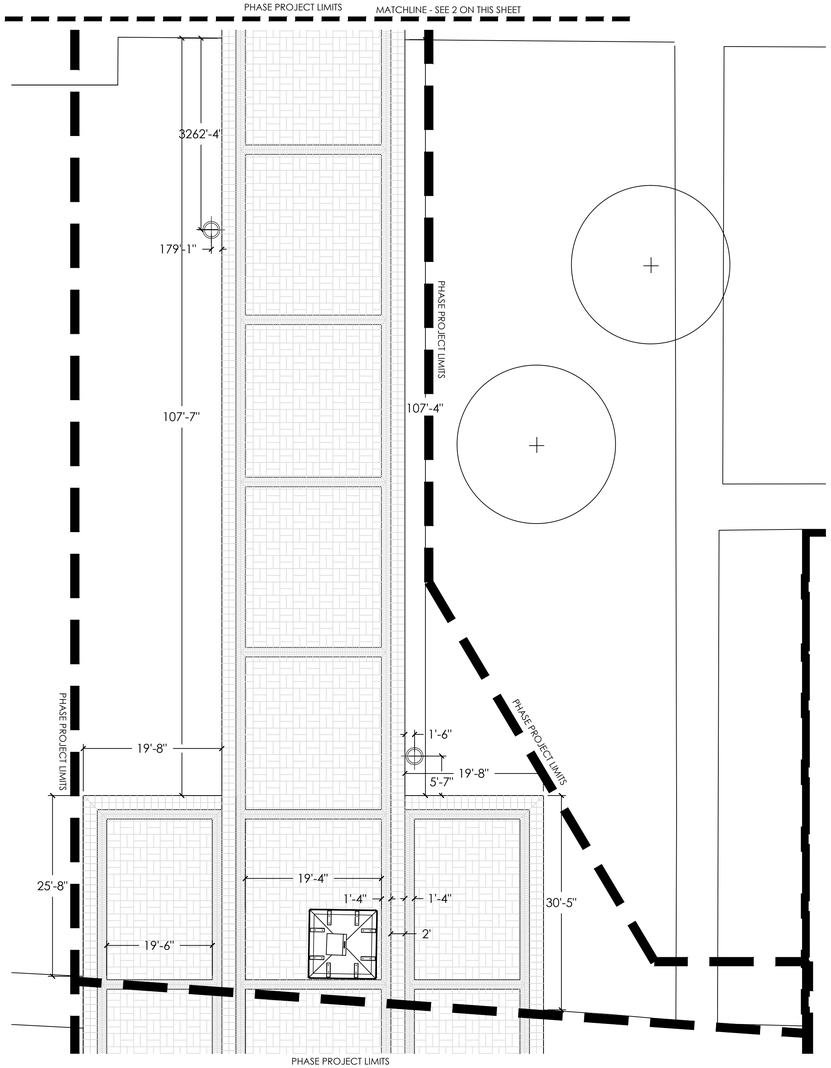
L-3.0



01 Dimension Plan

SCALE: 1" = 10'-0"

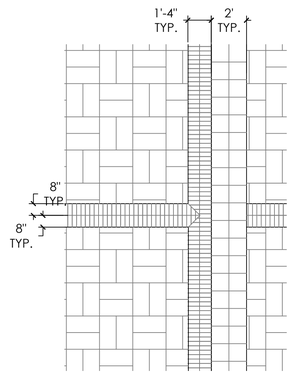
0 5 10 20



02 Dimension Plan

SCALE: 1" = 10'-0"

0 5 10 20



01 Paving Enlargement

SCALE: 1/4" = 1'-0"

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Scale: 1"=10'-0"

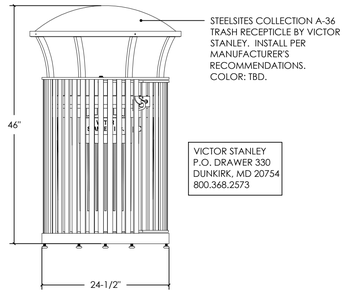
Dimension Plan

Sheet No.

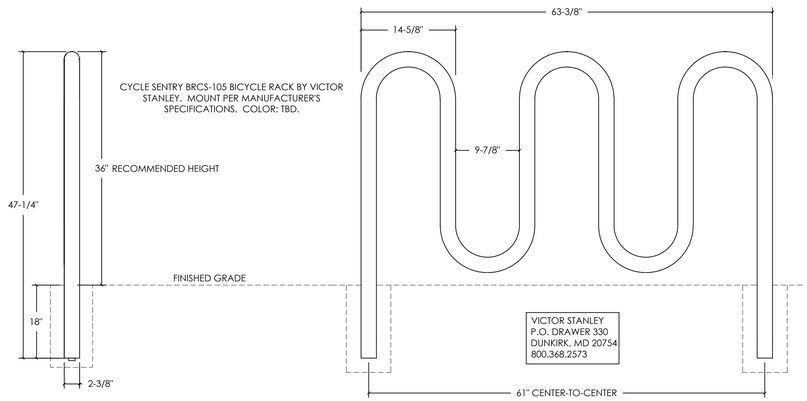
L-3.1

LANDSCAPE KEY NOTES:

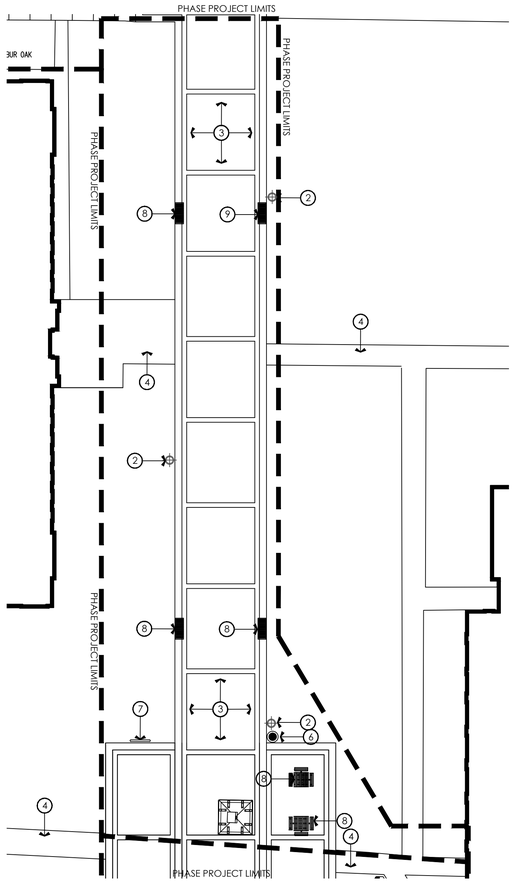
1. TYP. NEW PICNIC TABLE. SEE DETAILS AND SPECS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (4 / L-4.0)
2. TYP. NEW AREA LIGHT. SEE DETAILS AND SPECS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (5 / L-4.0)
3. PAVESTONE 80MM HOLLAND PAVER WALKWAY
4. EXISTING CONCRETE SIDEWALK
5. NEW 3,000 PSI CONCRETE WITH MEDIUM BROOM FINISH. SEE DIMENSION PLAN AND DETAILS FOR WIDTH AND JOINT SPACING.
6. NEW TRASH RECEPTACLE. SEE DETAILS AND SPECIFICATIONS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (1 / L-4.0)
7. TYP. BICYCLE RACK. SEE DETAILS AND SPECIFICATIONS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (2 / L-4.0)
8. TYP. BENCH. SEE DETAILS AND SPECIFICATIONS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (3 / L-4.0)



01 Trash Receptacle
SCALE: NTS



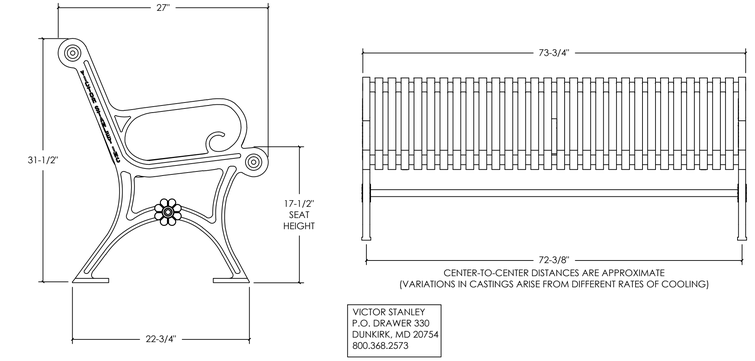
02 Bicycle Rack
SCALE: NTS



01 Amenities Plan
SCALE: 1" = 20'-0"

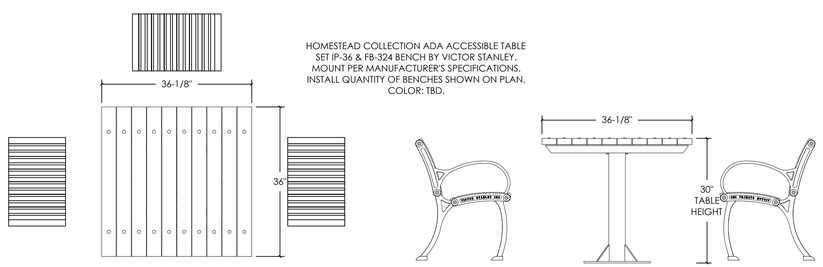
0 10 20 40

CLASSIC COLLECTION CR-196 6' BENCH BY VICTOR STANLEY. MOUNT PER MANUFACTURER'S SPECIFICATIONS. COLOR: TBD.

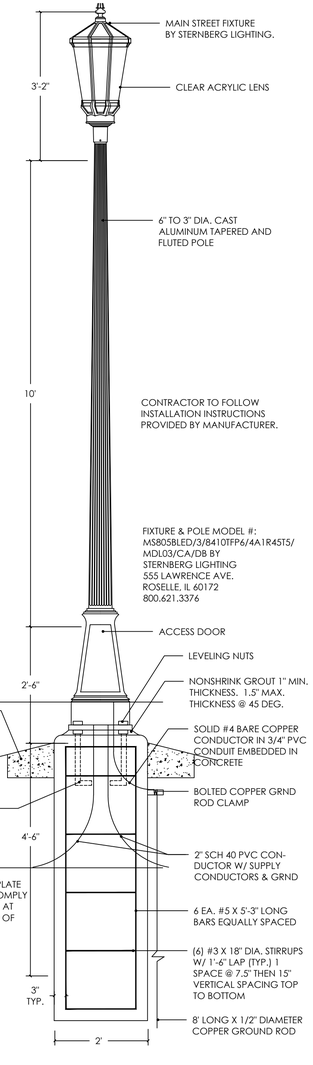


03 Bench
SCALE: NTS

HOMESTEAD COLLECTION ADA ACCESSIBLE TABLE SET IP-36 & FB-324 BENCH BY VICTOR STANLEY. MOUNT PER MANUFACTURER'S SPECIFICATIONS. INSTALL QUANTITY OF BENCHES SHOWN ON PLAN. COLOR: TBD.



04 Table Set
SCALE: NTS



05 Site Lighting
SCALE: NTS

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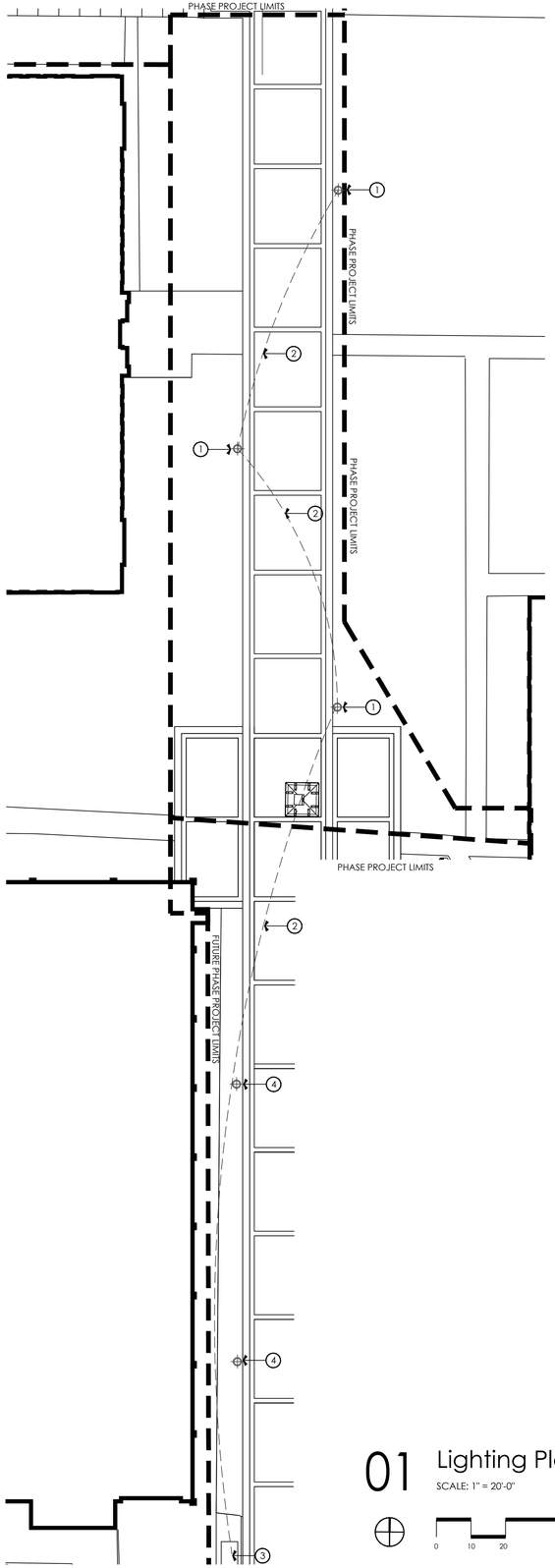
Amenities Plan

Sheet No.
L-4.0



01 Lighting Plan

SCALE: 1" = 20'-0"

KEY NOTES:

1. TYPICAL AREA LIGHT. MS805BLED/3/B410TFP6/4A1R4515/ MDL03/CA/DB BY STERNBERG LIGHTINGSEE DETAILS AND SPECIFICATIONS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (5 / L-4.0)
2. PROPOSED ELECTRICAL WIRE FOR LIGHTING. CONTRACTOR TO SIZE APPROPRIATELY FOR REQUIRED SUPPLY FOR BOTH NORTHERN AND SOUTHERN SECTIONS OF MUSTANG PLAZA. CONFIRM SOURCE WITH OWNER.
3. POWER SOURCE FOR LIGHTING.
4. LIGHTS NOT IN THIS PHASE.

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Scale: 1"=20'-0"

Lighting Plan

Sheet No.

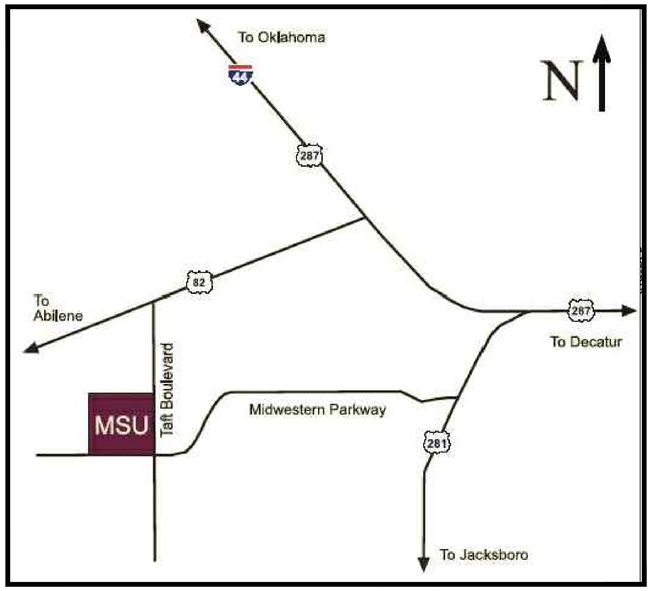
L-4.1

MIDWESTERN STATE UNIVERSITY

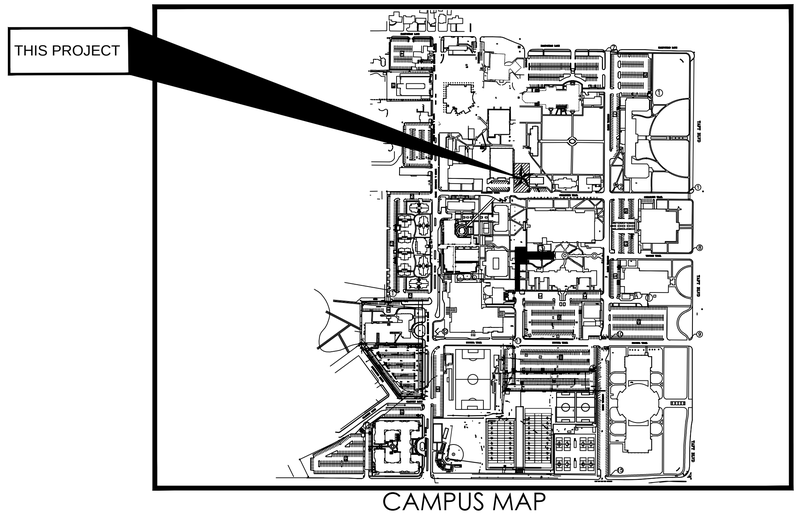
CAMPUS DEVELOPMENT PLAN

MUSTANG WALK-SOUTH EXTENSION PLANS

ISSUE FOR BID



GENERAL LOCATION



CAMPUS MAP

SITE PLAN	L-1.0
EXISTING CONDITIONS	L-2.0
SWPPP	L-2.1
DEMOLITION PLAN	L-2.2
HARDSCAPE	L-3.0
DIMENSION PLAN	L-3.1
PLANTING PLAN	L-4.0
IRRIGATION PLAN	L-4.1
IRRIGATION DETAILS	L-4.2
AMENITIES PLAN	L-5.0
LIGHTING PLAN	L-5.1

SHEET INDEX

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Facsimile: 432.683.3487
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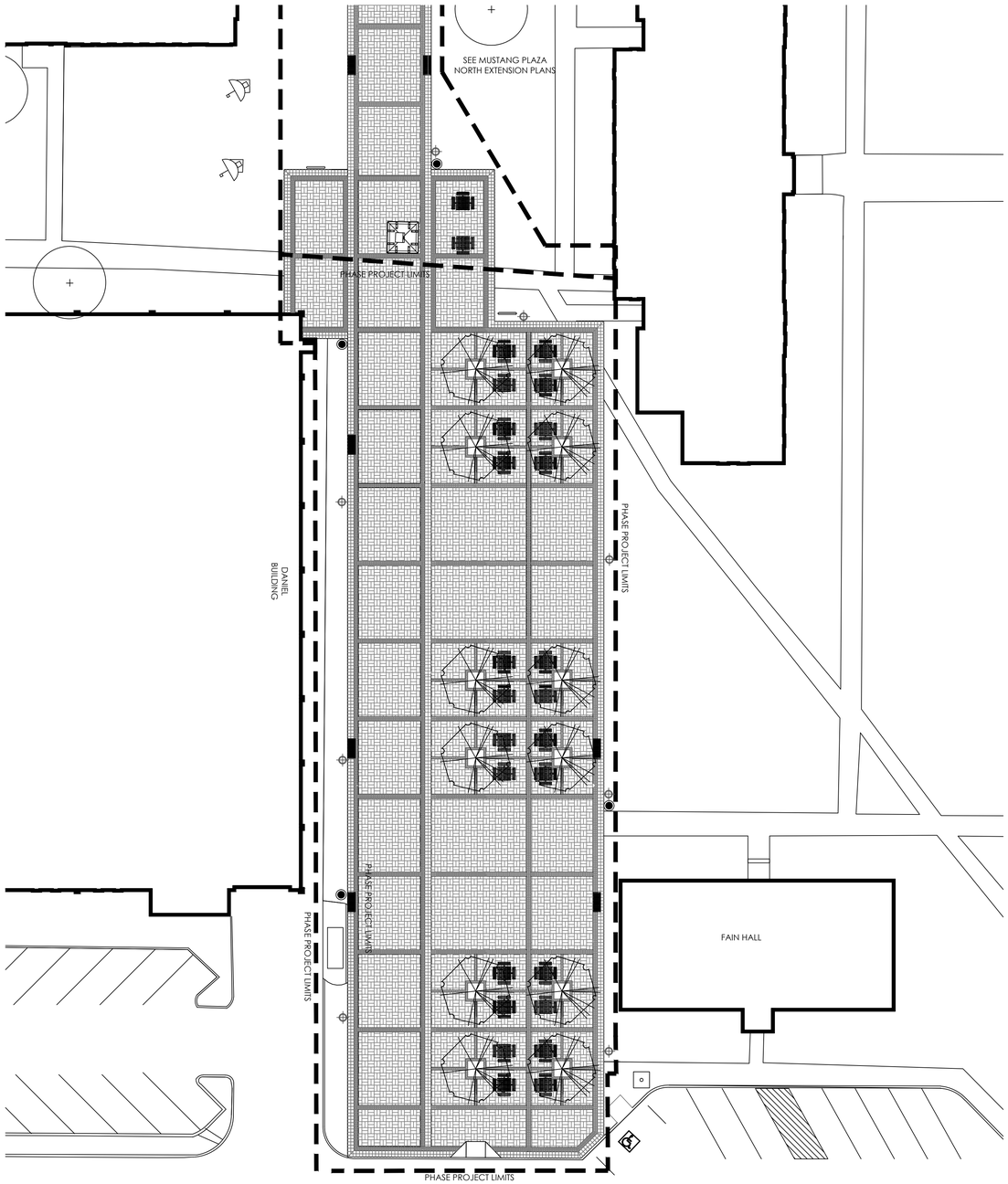

01 Proposed Site Plan

SCALE: 1" = 20'-0"

0 10 20 40

GENERAL NOTES AND CONDITIONS:

1. VERIFY EXISTING SITE INFORMATION, INCLUDING STRUCTURES, UTILITIES, PROPERTY LINES, LIMITS OF ROADWAYS, AND CURB/GUTTERS, THAT MAY EFFECT THE SCOPE OF WORK PRIOR TO BEGINING SITE CONSTRUCITON.

2. EXISTING UTILITIES ARE INDICATED FOR INFORMATION ONLY AND NOT INTENDED TO SHOW EXACT LOCATION. THE OWNER'S REPRESENTATIVE IS NOT RESPONSIBLE FOR THE LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN OR DETAILED AND INSTALLED BY ANY OTHER CONTRACT. THE CONTRACTOR SHALL LOCATE ALL UTILITIES AND MAINTAIN THE LOCATION DURING ALL PHASES OF THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO UTILITIES OR STRUCTURES AND ANY INJURIES THEREFROM. RESTORATION OF ANY UTILITIES DAMAGED BY THE CONTRACTOR SHALL BE AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.

3. THE CONTRACTOR SHALL TAKE ALL NECESSARY STEPS AS REQUIRED TO PROPERLY PROTECT AND MAINTAIN HIS WORK FOR THE DURATION OF THIS CONTRACT. EQUIPMENT SHALL BE REMOVED OR SECURELY AFFIXED TO SITE AT END OF WORK DAY. DAMAGE OR THEFT OF EQUIPMENT IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR, AND ANY INJURY OR OTHER LIABILITY ARISING FROM EQUIPMENT OR MATERIALS LEFT OR STORED ON SITE SHALL SOLELY BE THE RESPONSIBILITY OF THE CONTRACTOR.

4. PROVIDE WRITTEN NOTIFICATION OF ALL DISCREPANCIES BETWEEN EXISTING AND PROPOSED SITE IMPROVEMENTS.

5. ALL WORK SHALL COMPLY WITH ALL APPLICABLE CODES AND ORDINANCES OF THE CITY IN WHICH THE PROJECT IS LOCATED, AND THE STATE OF TEXAS.

6. ANYTHING MENTIONED IN THE TECHNICAL SPECIFICATIONS AND NOT SHOWN ON THE DRAWINGS, OR SHOWN ON THE DRAWINGS AND NOT MENTIONED IN THE TECHNICAL SPECIFICATIONS SHALL BE OF LIKE EFFECT AS IF SHOWN OR MENTIONED IN BOTH. IN CASE OF A DISCREPANCY BETWEEN THE DRAWINGS AND TECHNICAL SPECIFICATIONS, THE MATTER SHALL BE IMMEDIATELY SUBMITTED TO THE OWNERS REPRESENTATIVE. WITHOUT HIS DECISIONS, SAID DISCREPANCY SHALL NOT BE ADJUSTED BY THE CONTRACTOR, SAVE ONLY AT HIS OWN RISK AND EXPENSE.

7. CONTRACTOR SHALL STAKE OUT PLAN TO ITS FULL EXTENT AND SHALL OBTAIN THE APPROVAL OF THE LANDSCAPE ARCHITECT AND OWNER, MAKING MODIFICATIONS AS REQUIRED PRIOR TO PROCEEDING WITH THE WORK.

8. NOTES AND DETAILS ON SPECIFIED DRAWINGS TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.

9. ALL FINISHED GRADES SHALL PROVIDE FOR NATURAL RUNOFF OF WATER WITHOUT LOW SPOTS OR POCKETS. UNLESS SPECIFICALLY DRAWN AND DETAILED, ALL FLOW SHALL BE AWAY FROM ALL STRUCTURES, AND SHALL ONLY CROSS SIDEWALKS OR OTHER PEDESTRIAN FLOW AREAS WHERE NECESSARY.

10. HOLD FINISHED GRADES FOR PLANTING LAWN AREAS 1.5" BELOW TOP OF ADJACENT PAVEMENT. ALL FINISHED GRADES FOR PLANTING BEDS SHALL BE HELD AT 1" BELOW TOP OF ADJACENT PAVEMENT.

11. GRADUALLY ROUND OFF TOPS AND TOES OF ALL PLANTED SLOPES TO PRODUCE A SMOOTH ARCHITECTURAL TRANSITION BETWEEN RELATIVELY LEVEL AREAS AND SLOPES, UNLESS SPECIFICALLY DETAILED IN THE LANDSCAPE GRADING DETAILS.

12. ALL PAVING AREAS IN EXCESS OF 36" IN WIDTH SHALL HAVE LANDSCAPE SLEEVING PROVIDED. ALL SLEEVING SHALL BE A MINIMMUM OF 18" AND A MAXIMUM OF 24" IN DEPTH. SLEEVES SHALL EXTEND A MINIMUM OF 12" BEYOND THE EDGE OF ADJACENT PAVEMENT. SLEEVES SHALL BE CAPPED AND MARKED WITH FLAGS OR STAKES FOR FUTURE IDENTIFICATION. ALL SLEEVES SHALL BE A MINIMUM OF 4" SCH. 40 PVC PIPE IN STANDARD AREAS, AND SHALL BE 6" SCH. 40 PVC PIPE IN AREAS WHERE IRRIGATION MAINLINES ARE MARKED TO CROSS. A MINIMUM OF 2 SLEEVES SHALL BE USED WHENEVER ANY SLEEVING IS NECESSARY.

13. ALL EXISTING TREES AND VEGETATION SHOULD BE CONSIDERED AS REMAINING UNLESS OTHERWISE SPECIFICALLY SHOWN. DO NOT REMOVE ANY TREES WITHOUT SPECIFIC PERMISSION FROM THE LANDSCAPE ARCHITECT. ALL TREES SHALL BE PROTECTED BY A MINIMUM 3' TALL VINYL SNOW FENCE OR SIMILAR BARRIER. FENCING SHALL BE PLACED UNDER THE OUTERMOST EDGE OF THE CANOPY OF THE TREE. NO VEHICULAR TRAFFIC SHALL BE ALLOWED UNDER ANY TREE CANOPY FOR ANY REASON. NO SOLVENTS, THINNERS, PAINT, CONCRETE WASH, OR OTHER MATERIALS SHALL BE DISBURSED UNDER THE CANOPY OF ANY TREE.

14. UNLESS SPECIFICALLY INDICATED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION, MAINTENANCE, AND RESTORATION OF ANY ELECTRICAL, IRRIGATION AND DRAINAGE SYSTEMS ON SITE.

15. CONTRACTOR SHALL TAKE ALL NECESSARY STEPS TO NOTIFY ALL UTILITY COMPANIES PRIOR TO ANY DIGGING, TRENCHING, OR EXCAVATION ON SITE. CONSTRUCTION MAY NOT BEGIN PRIOR TO PROPER AND ACCURATE MARKING OF UNDERGROUND UTILITIES AND SECURING OF ANY AND ALL APPLICABLE PERMITS.

16. THE ELEMENTS WITHIN THIS PROJECT FALL WITHIN THE AMERICANS WITH DISABILITIES ACT, AND AS SUCH, ALL SIDEWALKS, GRADES, AND BUILDING ELEMENTS MUST COMPLY.

17. HOLES, TRENCHES, PITS, OR OTHER ELEMENTS WHICH COULD CAUSE FALLS OR OTHER ACCIDENTS SHALL BE FULLY PROTECTED AND MARKED BY THE CONTRACTOR, WHO ASSUMES FULL LIABILITY FOR ANY INJURIES OR DAMAGES CAUSED BY CONSTRUCTION.

18. SPEED AND COORDINATION OF CONSTRUCTION ELEMENTS AND WORK TRADES IS ESSENTIAL FOR THIS PROJECT AND CONTRACTOR SHALL USE ALL NECESSARY METHODS TO IMPLEMENT BOTH.

PROPOSED PAVER PLAZA

KDC Associates
4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
Phone: 432.684.8001
Fax/Info: 432.683.3487
www.KDCassociates.com
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MIDWESTERN STATE UNIVERSITY

WICHITA FALLS, TX

Date: 12.21.17
Revisions: 1.16.18
3.6.18

Scale: 1"=20'-0"

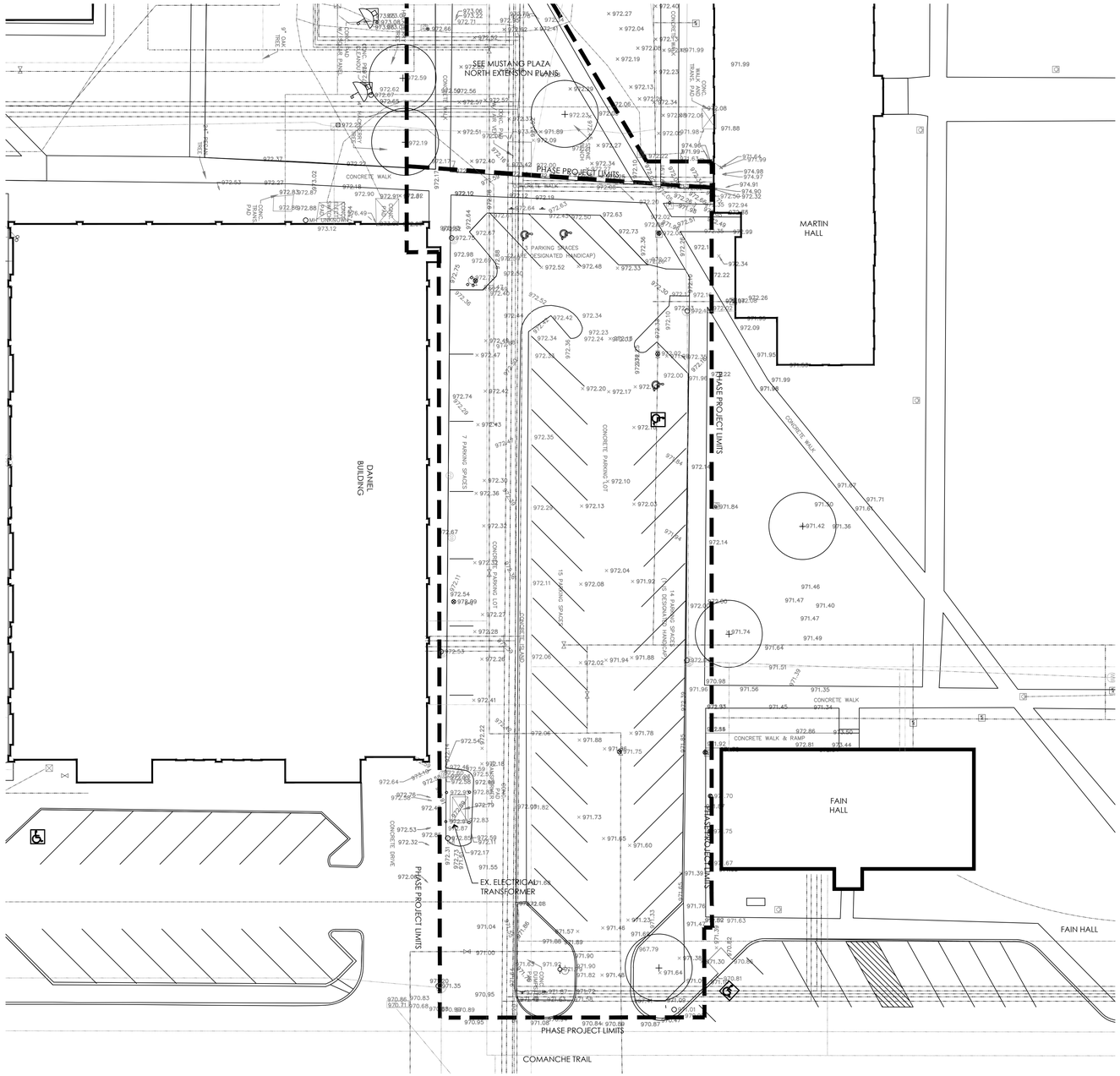
Site Plan

Sheet No.

L-1.0

KEY NOTES:

1. PHASE PROJECT LIMITS
2. EXISTING ELECTRIC TRANSFORMER



01 Existing Conditions

SCALE: 1" = 20'-0"

0 10 20 40

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4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
Phone: 432.684.8001
Fax/Info: 432.683.3487
www.KDCassociates.com
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MIDWESTERN STATE UNIVERSITY

WICHITA FALLS, TX

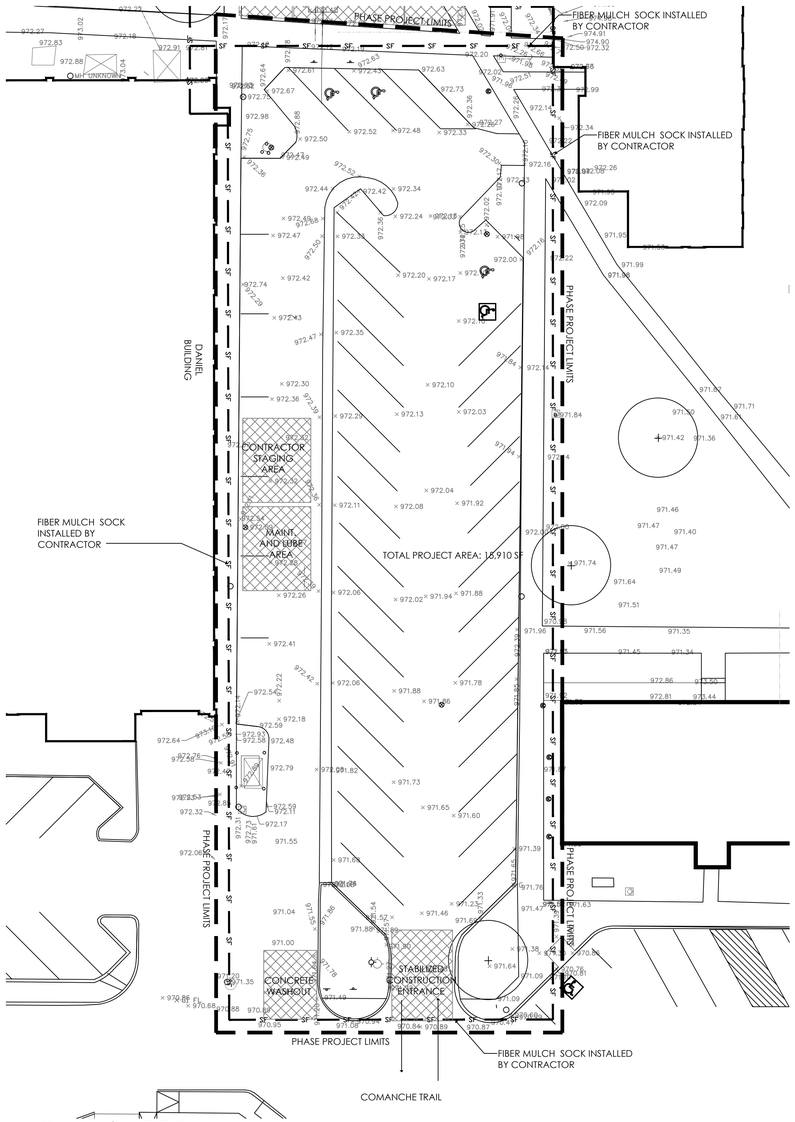
Date: 12.21.17
Revisions: 3.6.18

Scale: 1"=20'-0"

Existing Conditions

Sheet No.

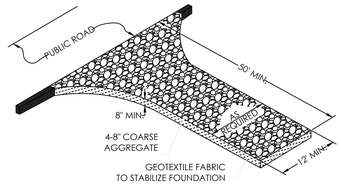
L-2.0



01 SWPPP

SCALE: 1" = 20'-0"

0 10 20 40



01 Typ. Construction Entrance

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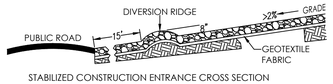
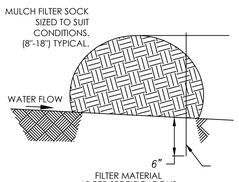
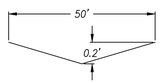


STABILIZED CONSTRUCTION ENTRANCE CROSS SECTION



02 Mulch Filter Sock Detail

SCALE: NTS



03 Interceptor Swale

SCALE: NTS

GENERAL SWPPP NOTES:

1. CONCRETE BATCH PLANTS, HOT MIX ASPHALTIC CONRETE PLANTS, AND FILL MATERIAL SOURCES ARE LOCATED AT OFF-SITE FACILITIES.
2. AREAS FOR STAGING CONSTRUCTION TRAFFIC, PARKING, VEHICULAR MAINTENANCE, CONCRETE TRUCK WASHING, AND VEHICLE WASHING SHALL BE WITHIN THE LIMITS OF THE SWPPP PERIMETER CONTROLS. STAGE AREAS TO INCLUDE ALL LOCTATIONS TO BE NOTED BY THE CONTRACTOR, FUEL STORAGE AREA, AND PORTA-TOILET LOCATIONS.
3. THE SWPPP CONTROLS WILL BE INSTALLED BY THE CONTRACTOR, WHO SHALL ALSO FILE ALL NECESSARY TCEQ PERMIT DOCUMENTS (NOI, NOC, NOT).
4. ALL OPERATORS SHALL COMPLY WITH INSPECTION, MAINTENANCE AND REPORTING REQUIREMENTS OF THE GENERAL PERMIT.
5. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 32' OF THE TEMPORARY CONCRTE WASHOUT FACILITY.
6. CONCRETE WASHOUT PLASTIC LINER SHALL BE ANCHORED WITH GRAVEL FILLED BAGS.
7. PLASTIC LINER SHALL BE MJN. 20 MIL THICKNESS.

EROSION CONTROL NOTES:

1. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PHASE OF THE PROJECT ACCORDING TO THE FOLLOWING SCHEDLUE:
A. FILTER FABRIC (SILT) FENCE OR WADDELS:
   a. ACCUMULATED SEDIMENTS WILL BE REMOVED AS REQUIRED TO KEEP THE BARRIER FUNCTIONAL
   b. ALL UNDERCUTTIN OR EROSION OF THE TOE ANCHOR WILL BE REPAIRED IMMEDIATELY WITH COMPACTED BACKFILL MATERIAL
   c. ADHERE TO ANY MANUFACTUER'S RECOMMENDATIONS FOR REPLACING FILTER FABRIC OR WADDELS DURING CONSTRUCTION
2. SITE INSPECTIONS MUST BE MADE AT LEASTE ONCE EVERY 14 DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT 5" OR GREATER OR AT LEAST EVERY 7 DAYS REGARDLESS OF PRECIPITATION.
3. AS SITE CONDITIONS CHANGE, NECESSARY ADJUSTMENTS WILL BE MADE BY CONTRACTOR/OWNER IN THE FIELD TO REDUCE STORM WATER RUNOFF AS NEEDED. SHOULD THE MEASURES SHOWN HEREON BE INSUFFICIENT TO REDUCE RUNOFF, THE CONTRACTOR/OWNER SHALL BE RESPONSIBLE FOR FIELD ADJUSTMENT TO BE MORE EFFECTIVE FOR RUNOFF.
4. UPON ADJUSTING AND/OR ALTERING SORM WATER POLLUTION PREVENTION MEASURES ONSITE, THE CONTRACTOR/OWNER SHALL BE RESPONSIBLE FOR UPDATING AND REVISING SITE MAP IN A TIMELY MANNER.
5. SHOULD TCEQ OR AN AUTHORIZED AGENCY OF, MODIFY STORM WATER REGULATIONS PRIOR TO THE COMPLETION OF CONSTRUCTION, THE CONTRACTOR/OWNER SHALL BE RESPONSIBLE FOR MAKING NECESSARY MODIFICATIONS TO THE RUNOFF REDUCTION MEASURES IN PLACE IN ORDER TO COMPLY WITH THE MOST CURRENT REGULATIONS.
6. PERIMETER CONTROL MEASURES WILL BE MAINTAINED DURING CONSTRUCTION AND UNTIL THE SITE HAS ACHIEVED 70% NATIVE BACKGROUND VEGETATION.
7. 70% STABILIZATION MAY INCLUDE PAVEMENT AND/OR THE ESTABLISHED LANDSCAPING THAT WILL PREVENT STORM WATER RUNOFF FROM ERODING OR COMPROMISING THE SITE AND DOWNSTREAM DRAINAGE FACILITIES.
8. UPON FINAL STABILIZATION, THE CONTRACTOR/OWNER IS RESPONSIBLE FOR REMOVING TEMPORARY EROSION CONTROL STRUCTURES.

ROCK CHECK DAM NOTES:

1. RIPRAP SIZE FOR ROCK CHECK DAM AND CONCRETE WASHOUT TO BE 4" - 8" CALICHE COURSE AGGREGATE.
2. CHECK DAMS MAY BE USED IN SLOPING DITCHES OR CHANNELS TO SLOW VELOCITY OR TO CREATE SEDIMENT TRAPS.
3. ENSURE THAT THE MAXIMUM SPACING BETWEEN DAMS PLACES THE TOE OF THE UPSTREAM DAM AT THE SAME ELEVATION AS THE DOWNSTREAM DAM.

SILT FENCING NOTES:

1. STEEL POST OR STAKES WHICH SUPPORT THE FENCE OR WADDELS SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE.
2. POST/STAKES MUST BE IMBEDDED 12". THE TOE OF THE BARRIER SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW.
3. SILT FENCE/WADDELS SHALL BE SECURELY FASTENED TO EACH STEEL POST OR STAKE, OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POST.
4. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. SILT FENCE/WADDEL SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE. ACCUMULATED SILT OR DEBRIS SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 6".
6. THE SILT OR DEBRIS SHALL BE DISPOSED OF IN AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITONAL SILTATION.

CONSTRUCTION ENTRANCE NOTES:

1. CONSTRUCTION ENTRANCE TO BE AN 8" MINIMUM DEPTH COARSE AGGREGATE OVER GEOTEXTILE FILTER FABRIC. RIPRAP SIZE TO BE 4" - 8".
2. A CHAIN-ANCHORED 4" STEEL PIPE SHALL BE PLACED WITHIN THE AGGREGATE AT THE ENTRANCE TO THE CONSTRUCTION SITE.

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4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
Phone: 432.686.8051
Fax/Info: 432.683.3487
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MUSTANG WALK SOUTH EXTENSION DEVELOPMENT PLANS

MIDWESTERN STATE UNIVERSITY
WICHITA FALLS, TX

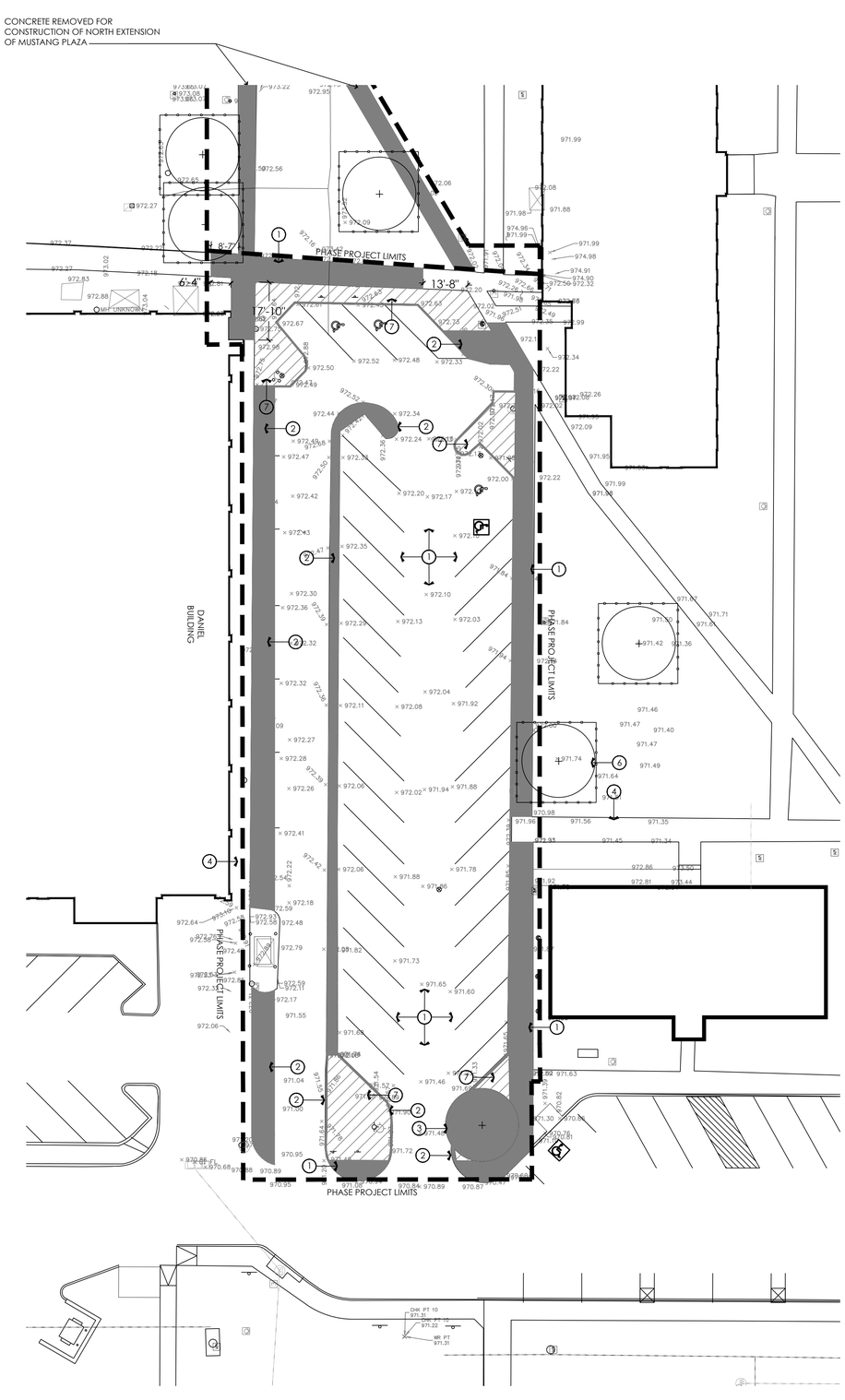
Date: 12.21.17
Revisions:
3.6.18

Scale: 1"=20'-0"

SWPPP

Sheet No.

L-2.1



01 Demolition Plan

SCALE: 1" = 20'-0"

DEMOLITION NOTES:

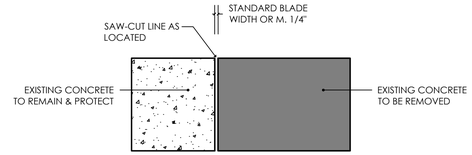
1. PRIOR TO ANY DEMOLITION, GENERAL CONTRACTOR TO CONTACT ALL EXISTING UTILITY COMPANIES TO LOCATE ALL UTILITIES BY AUTHORIZED PERSONNEL OF UTILITY COMPANIES.
2. PRIOR TO ANY ABONDONMENT OF EXISTING UTILIES, GENERAL CONTRACTOR SHALL CONTACT AUTHORIZED PERSONNEL OF UTILITY COMPANIES FOR COORDINATION AND LOCATION OF UTILITY ABONDONMENT.
3. ALL EXISTING UTILITIES TO BE ABONDONED MAY BE, AT THE DISCRETION OF THE GENERAL CONTRACTOR, COMPLETELY REMOVED OR HAVE PORTIONS REMOVED TO FACILITATE THE INSTALLATION OF NEW UTILITIES. ANY ABONDONED UTILITIES WHICH ARE CUT SHALL BE PERMANENTLY PLUGGED AND CAPPED PER UTILITY COMPANY REQUIREMENTS.
4. IF AN UNMAPPED UTILITY IS LOCATED, THE GENERAL CONTRACTOR SHALL CONTACT MSU SYSTEM CONSTRUCTION MANAGER TO DETERMINE IF IT WILL BE REMOVED OR ABANDONED IN PLACE.
5. GENERAL CONTRACTOR SHALL COORDINATE THE REMOVAL OF ALL WATER LINES WITH MSU.
6. GENERAL CONTRACTOR SHALL RETURN ALL REMOVED LIGHT STANDARDS TO MSU. CONTRACTOR SHALL ALSO PROVIDE INFORMATION ABOUT THE SIZE AND GEOMETRIC PATTERN OF THE ANCHOR BOLTS REMOVED.
7. GENERAL CONTRACTOR SHALL RETURN ALL STOP SIGNS AND POLES TO MSU.
8. WHERE POSSIBLE, GENERAL CONTRACTOR TO NOT REMOVE EXISTING PARKING LOT BASE MATERIALS SO THEY MAY BE USED AS COMPACTED BASE FOR THE NEW PAVER WALKWAY.

KEY NOTES:

1. REMOVE EXISTING CONCRETE. BRING IN NEW BACKFILL AS NEEDED. IF ONLY PORTION OF CONCRETE BEING REMOVED, SAW CUT CONCRETE TO MAINTAIN CLEAN EDGE.
2. REMOVE EXISTING CURB OR OTHER MISC FOR CONSTRUCTION.
3. REMOVE EXISTING TREE.
4. EXISTING CONCRETE SIDEWALK TO REMAIN. SAW CUT (IF NEEDED) AND PROTECT.
5. CONSTRUCTION PROJECT LIMITS.
6. PRESERVE AND PROTECT EXISTING TREE TO REMAIN.
7. REMOVE EXISTING SOIL TO BRING TO GRADE FOR PAVER INSTALLATION.

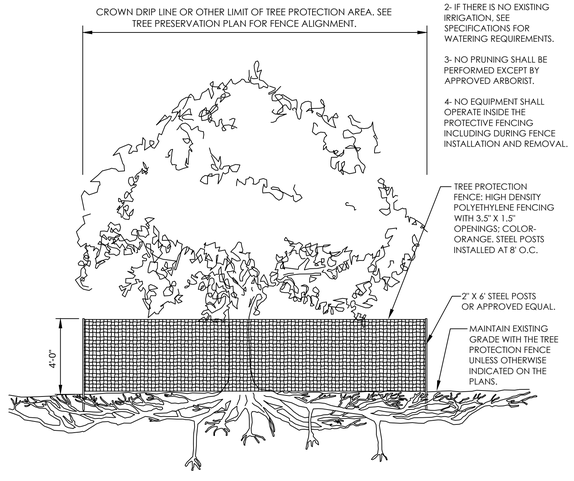
REMOVE EXISTING CONCRETE

REMOVE EXISTING SOIL TO BRING TO GRADE FOR CONSTRUCTION



01 Saw Cut Detail

SCALE: NTS



NOTES:
1- SEE SPECIFICATIONS FOR ADDITIONAL TREE PROTECTION REQUIREMENTS.

2- IF THERE IS NO EXISTING IRRIGATION, SEE SPECIFICATIONS FOR WATERING REQUIREMENTS.

3- NO PRUNING SHALL BE PERFORMED EXCEPT BY APPROVED ARBORIST.

4- NO EQUIPMENT SHALL OPERATE INSIDE THE PROTECTIVE FENCING INCLUDING DURING FENCE INSTALLATION AND REMOVAL.

02 Tree Protection Detail

SCALE: NTS

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4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
Phone: 432.684.8001
Fax/Info: 432.683.3487
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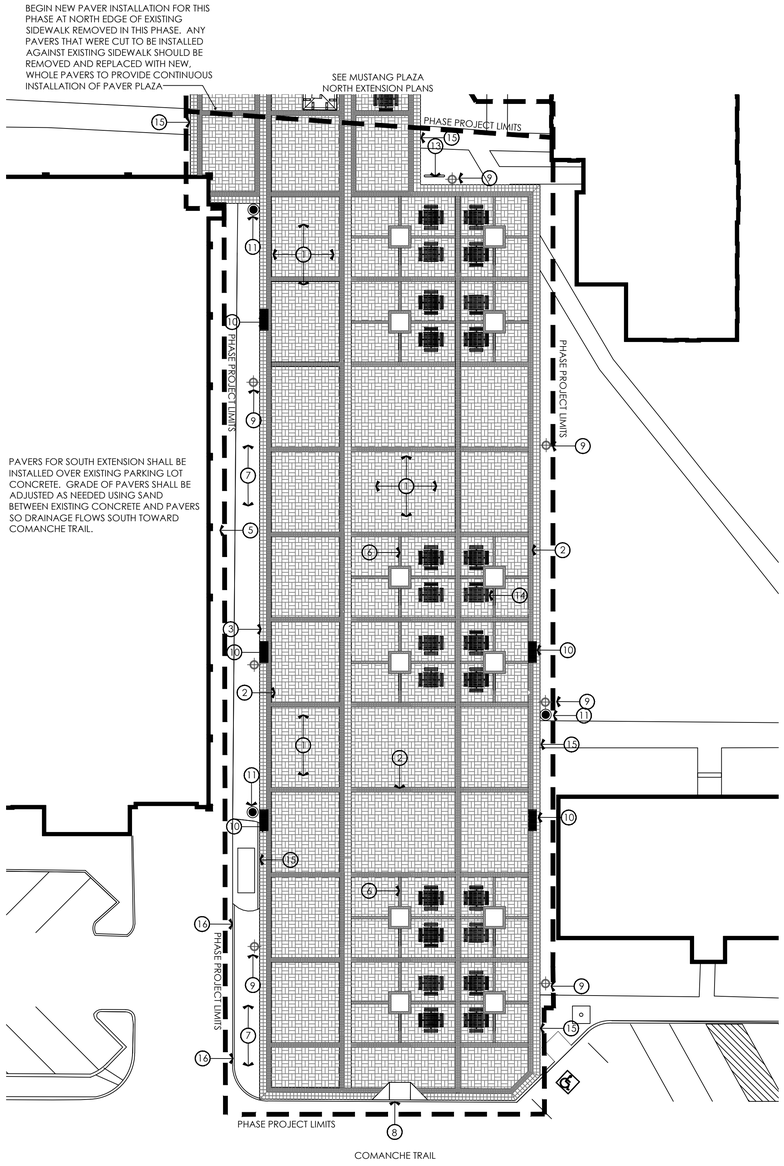
Demolition Plan

Sheet No.

L-2.2



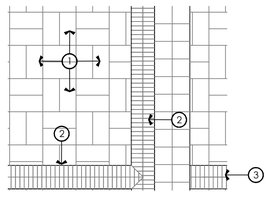
01 Hardscape Plan

SCALE: 1" = 20'-0"

0 10 20 40

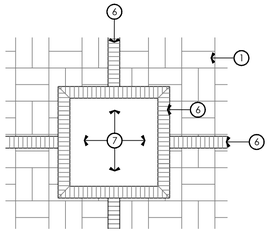
KEY NOTES:

1. PAVER WALKWAY WITH BELGARD OR PAVESTONE 80MM HOLLAND PAVER (#219) IN A BASKET WEAVE PATTERN AS SHOWN USING 4" X 8" PAVERS. COLOR: ANTIQUE TERRA COTTA; CONTRACTOR TO SUBMIT SAMPLES. (3-4 L-3.0)
2. DOUBLE ROWLOCK PAVER BORDER USING 4" X 8" BELGARD OR PAVESTONE 80MM HOLLAND PAVER (#219). COLOR: CHARCOAL; CONTRACTOR TO SUBMIT SAMPLES. (3-4 L-3.0)
3. DOUBLE PAVER BORDER 12"X12" 80MM USING BELGARD OR PAVESTONE HOLLAND PAVER (#219). COLOR: PEWTER; CONTRACTOR TO SUBMIT SAMPLES. (3-4 L-3.0)
4. NEW 3,000 PSI CONCRETE WITH MEDIUM BROOM FINISH. SEE DIMENSION PLAN AND DETAILS FOR WIDTH AND JOINT SPACING. (7 L-3.0)
5. EXISTING CONCRETE TO REMAIN.
6. SINGLE ROW ROWLOCK USING BELGARD OR PAVESTONE 80MM HOLLAND PAVER (#219). CONTRACTOR TO SUBMIT SAMPLES FOR COLOR SELECTION BY OWNER. (3-4 L-3.0)
7. PLANTER; SOIL WITH DECOMPOSED GRANITE.
8. NEW ACCESSIBLE CONCRETE RAMP. (5-9 L-3.0)
9. TYP. AREA LIGHT. SEE SHEET L-4.1
10. TYP. BENCH. SEE SHEET L-4.1
11. TYP. TRASH RECEPTACLE. SEE SHEET L-4.1
12. TYP. PICNIC TABLE. SEE SHEET L-4.1
13. TYP. BIKE RACK. SEE SHEET L-4.1
14. TYP. PICNIC TABLE. SEE SHEET L-4.1
15. CONTRACTOR TO PROVIDE SMOOTH TRANSITION BETWEEN EXISTING CONCRETE AND NEW PAVERS. (4 L-3.0)
16. NEW 6" CONCRETE CURB WITH 12" GUTTER TO SERVE AS PLANTER BORDER AND DRIVEWAY EDGE. (10 L-3.0)



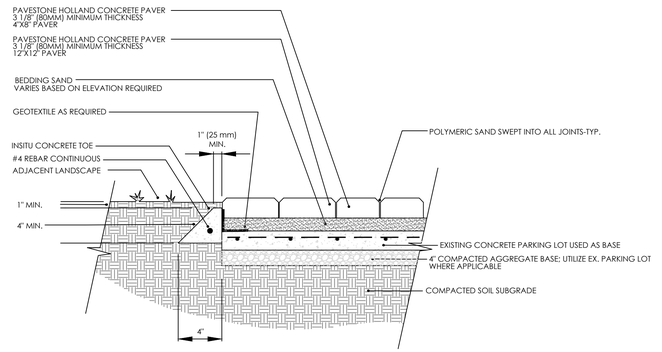
01 Paver Enlargement

SCALE: 1/4"=1'-0"



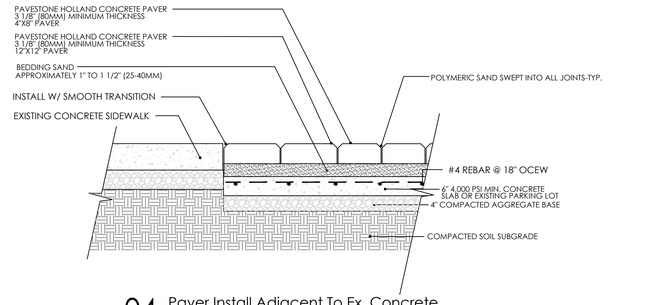
02 Planter Enlargement

SCALE: 1/4"=1'-0"



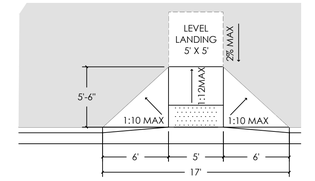
03 Standard Fire Lane Paver W/ Toe Edge

SCALE: NTS



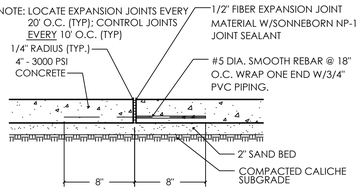
04 Paver Install Adjacent To Ex. Concrete

SCALE: NTS



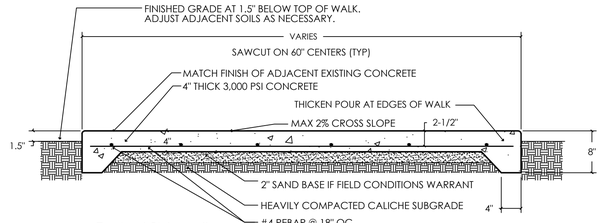
05 Typical Handicap Ramp

SCALE: NTS



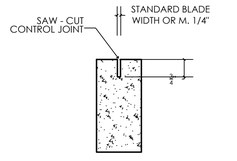
06 Concrete Cold Joint

SCALE: NTS



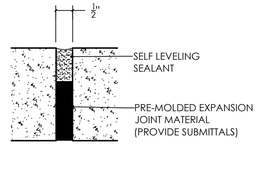
07 Typical Sidewalk

SCALE: NTS



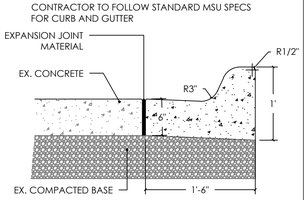
08 Control Joint

SCALE: NTS



09 Expansion Joint

SCALE: NTS



10 Curb & Gutter

SCALE: NTS

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MIDWESTERN STATE UNIVERSITY
WICHITA FALLS, TX

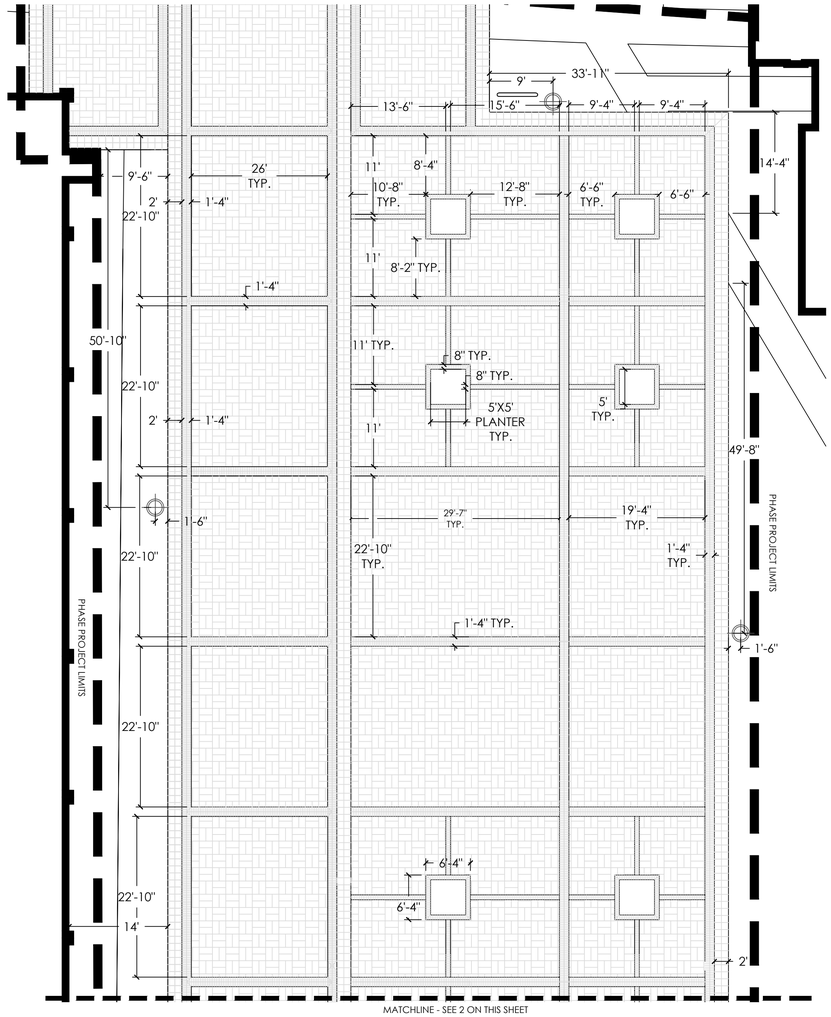
Date: 12.21.17
Revisions: 1.16.18
3.6.18

Scale: 1"=20'-0"

Hardscape Plan

Sheet No.

L-3.0



01 Dimension Plan

SCALE: 1" = 10'-0"

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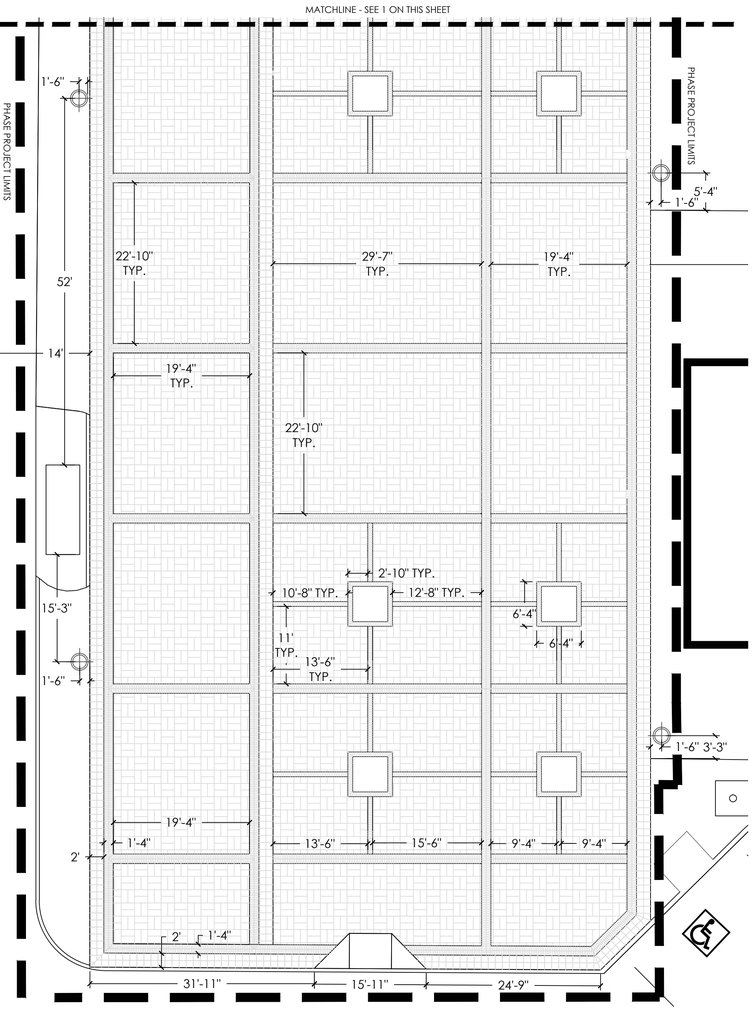

02 Dimension Plan

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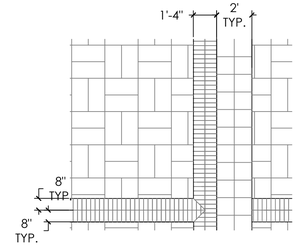
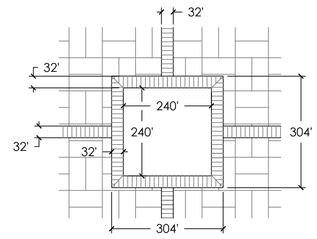


01 Paver Enlargement

SCALE: 1/4"=1'-0"



02 Planter Enlargement

SCALE: 1/4"=1'-0"

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Dimension Plan

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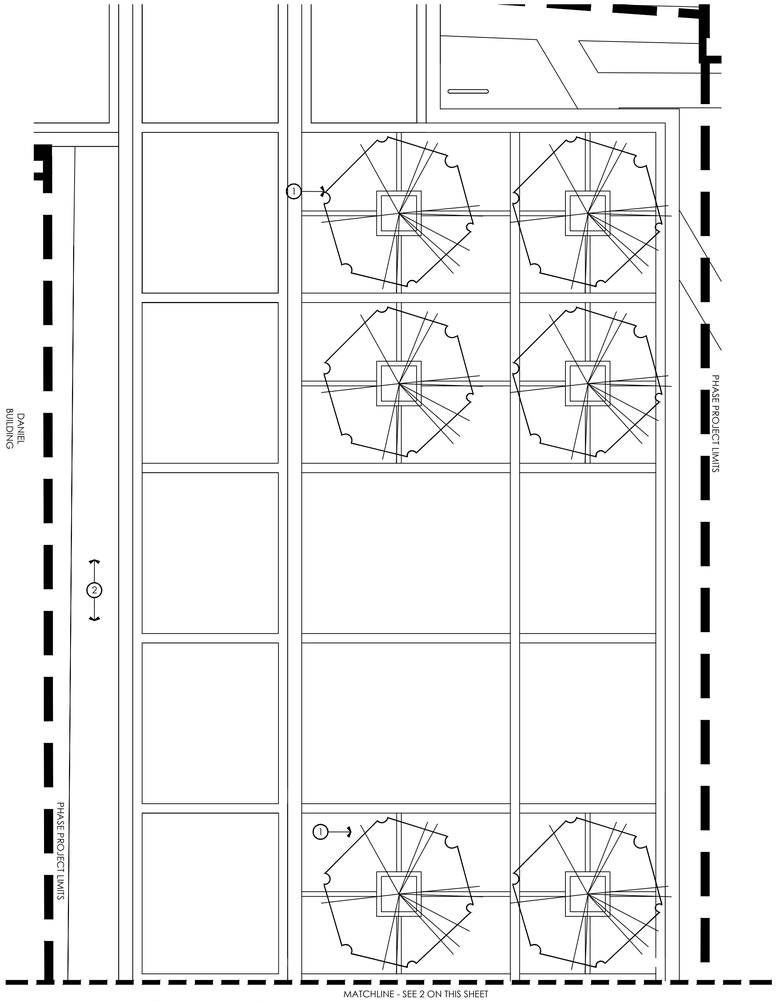
L-3.1



01 Planting Plan

SCALE: 1" = 10'-0"

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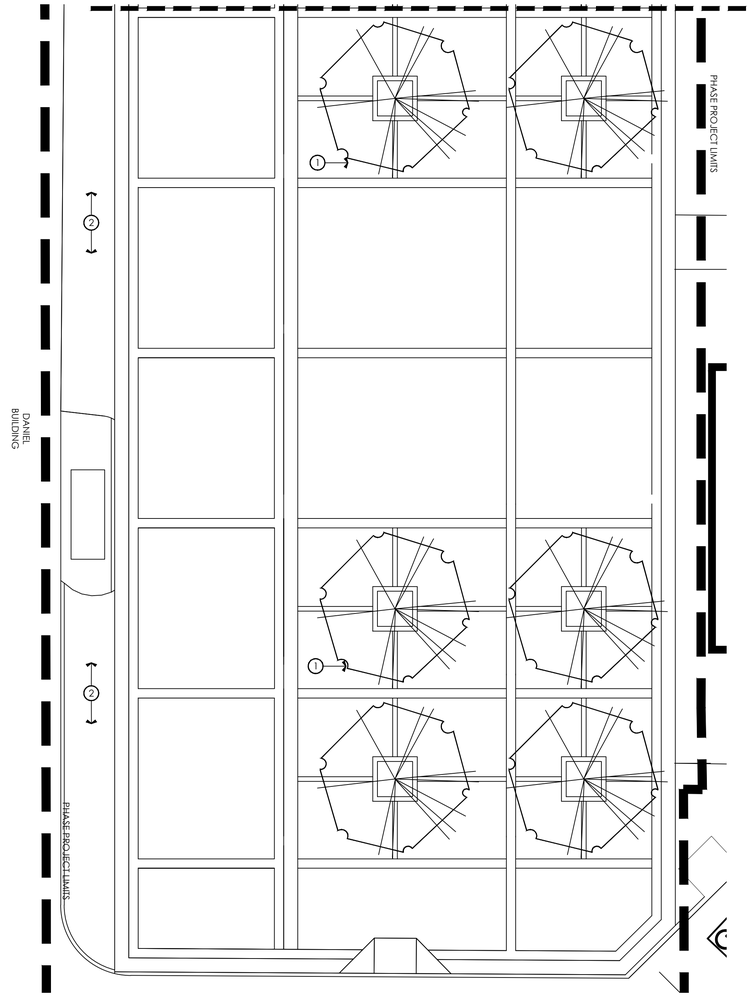

02 Planting Plan

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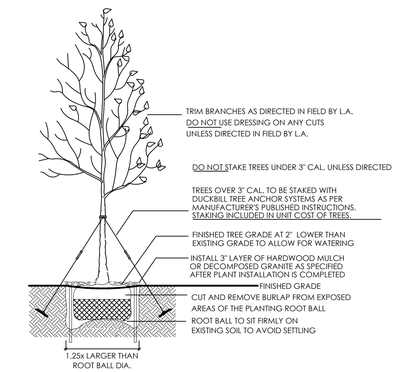
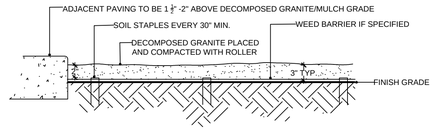


01 Tree Installation - 4" Caliper And Over

SCALE: NTS



02 Decomposed Granite - Planting Beds

SCALE: NTS

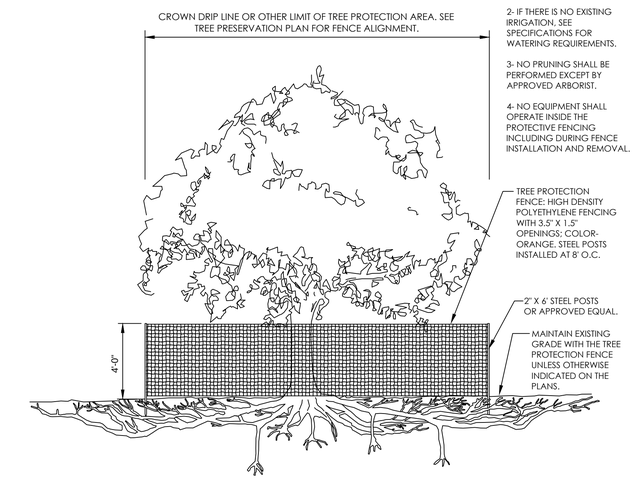
LANDSCAPE KEY NOTES:

PROVIDE PHOTOGRAPH SUBMITTALS OF ALL TREE MATERIAL

1. TAXODIUM DISTICHUM TREE (12)- 2" CALIPER; SINGLE TRUNK; NURSERY CONTAINER GROWN ONLY, MIN 100 GALLON CONTAINER; MIN. 8' TALL, MIN. 4' WIDE WITH VERY FULL AND SIMILAR CANOPY SIZE, HEIGHT, AND SHAPE. SPECIMEN QUALITY ONLY.
2. 3" THICK 1/2" SCREENED DECOMPOSED GRANITE OVER WEED BARRIER FABRIC IN ALL PLANTING AREAS.

GENERAL NOTES:

1. THERE ARE KNOWN ON THIS SITE TO EXIST UNDERGROUND WATER, ELECTRIC, GAS, FIBER OPTIC, AND OTHER UTILITIES WHICH COULD BE DAMAGED DURING CONSTRUCTION. LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR CONTACTING ANY AND ALL NECESSARY AGENCIES TO FIELD LOCATE SUCH LINES. LANDSCAPE CONTRACTOR SHALL BE SOLEY RESPONSIBLE FOR ALL MONETARY AND PHYSICAL DAMAGES RESULTING FROM STRIKING LINES WHICH ARE ABOVE OR BELOW GRADE, AND COULD HAVE BEEN LOCATED BY ANY GIVEN AGENCY.
2. PLANTING OF ALL MATERIALS SHALL OCCUR DURING THE APPROPRIATE PLANTING SEASON. WHERE QUESTIONS ARISE DUE TO SEASONAL CONSIDERATIONS, THE LANDSCAPE CONTRACTOR SHALL CONTACT THE LANDSCAPE ARCHITECT AND OWNER IN WRITING AND REQUEST WRITTEN INSTRUCTIONS PERTAINING TO THE PLANTING ISSUE.
3. ALL HOLES FOR TREES AND SHRUBS SHALL BE TWICE THE DIAMETER OF THE ROOTBALL AND 1.5X THE DEPTH.
4. UNLESS PRIOR WRITTEN CONSENT IS GIVEN BY THE LANDSCAPE ARCHITECT, NO SUBSTITUTIONS SHALL BE ALLOWED. ANY/ALL PLANT MATERIAL CAN BE REJECTED BY THE LANDSCAPE ARCHITECT OR OWNER DUE TO QUALITY OR DISEASE ISSUES AT ANY TIME DURING CONSTRUCTION. WHEN THIS OCCURS, IT SHALL BE THE LANDSCAPE CONTRACTOR'S RESPONSIBILITY TO LOCATE NEW AND APPROVED MATERIAL IN A TIMELY MANNER.
5. NO TREE HOLES SHALL BE LEFT UNMARKED OVERNIGHT. IF CONDITIONS DEVELOP IN WHICH IT IS APPROPRIATE FOR HOLES TO LEFT OVERNIGHT, THE CONTRACTOR SHALL SECURELY COVER THE TREE HOLES WITH ¾" PLYWOOD AND PLACE A WELL MARKED SECURITY FENCE AROUND EACH HOLE. UNDER NO CIRCUMSTANCES SHALL IRRIGATION TRENCHES BE LEFT UNCOVERED.
6. CONTRACTOR TO PROTECT EXISTING ADJACENT IRRIGATION SYSTEMS AND PROVIDE ALL ADJACENT SITES WITH UNINTERUPTED AND REGULAR WATERING OF EXISTING LANDSCAPES AT ALL ADJACENT SITES. MARK ALL HEADS, VALVES, AND MAINLINES PRIOR TO CONSTRUCTION. REMOVE AND REUSE ANY EXISTING ROTOR HEADS THAT MUST BE MOVED FOR CONSTRUCTION.
7. ALL PAVING AREAS IN EXCESS OF 36" IN WIDTH SHALL HAVE LANDSCAPE SLEEVING PROVIDED. ALL SLEEVING SHALL BE A MINIMMUM OF 18" AND A MAXIMUM OF 24" IN DEPTH. SLEEVES SHALL EXTEND A MINIMUM OF 12" BEYOND THE EDGE OF ADJACENT PAVEMENT. SLEEVES SHALL BE CAPPED AND MARKED WITH FLAGS OR STAKES FOR FUTURE IDENTIFICATION. ALL SLEEVES SHALL BE A MINIMUM OF 4" SCH. 40 PVC PIPE IN STANDARD AREAS, AND SHALL BE 6" SCH. 40 PVC PIPE IN AREAS WHERE IRRIGATION MAINLINES ARE MARKED TO CROSS. A MINIMUM OF 2 SLEEVES SHALL BE USED WHENEVER ANY SLEEVING IS NECESSARY.



03 Tree Protection Detail

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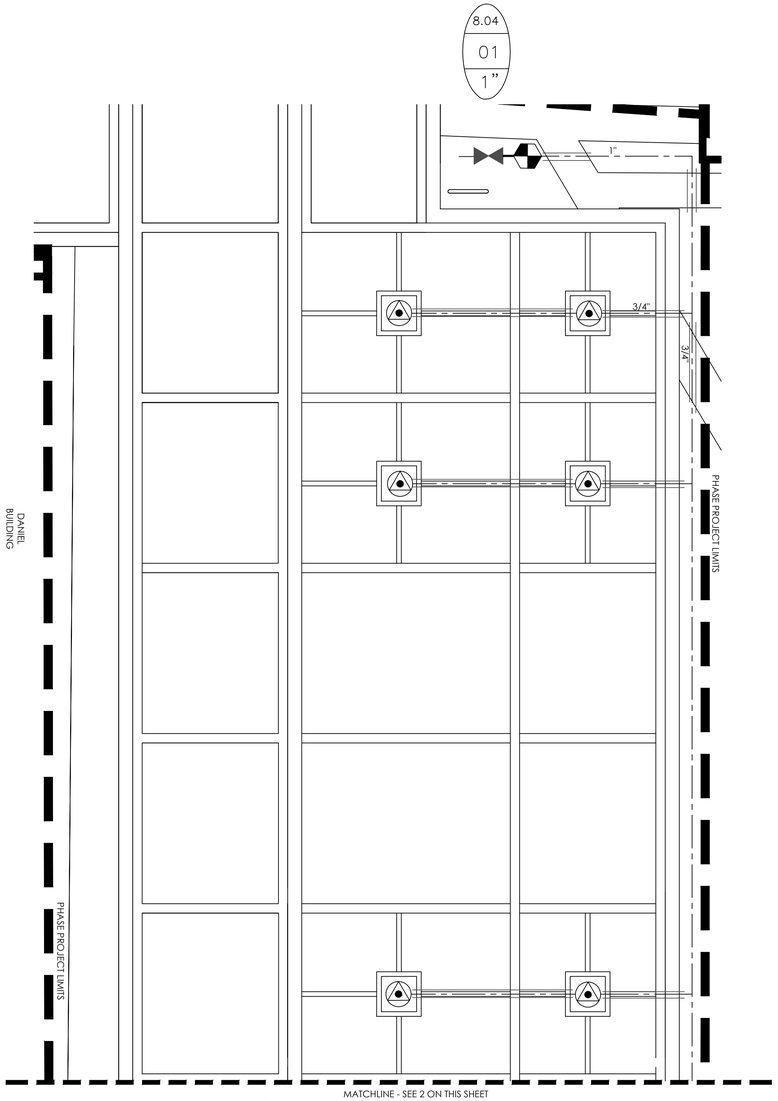
Planting Plan

Sheet No.

L-4.0



01 Irrigation Plan

SCALE: 1" = 10'-0"

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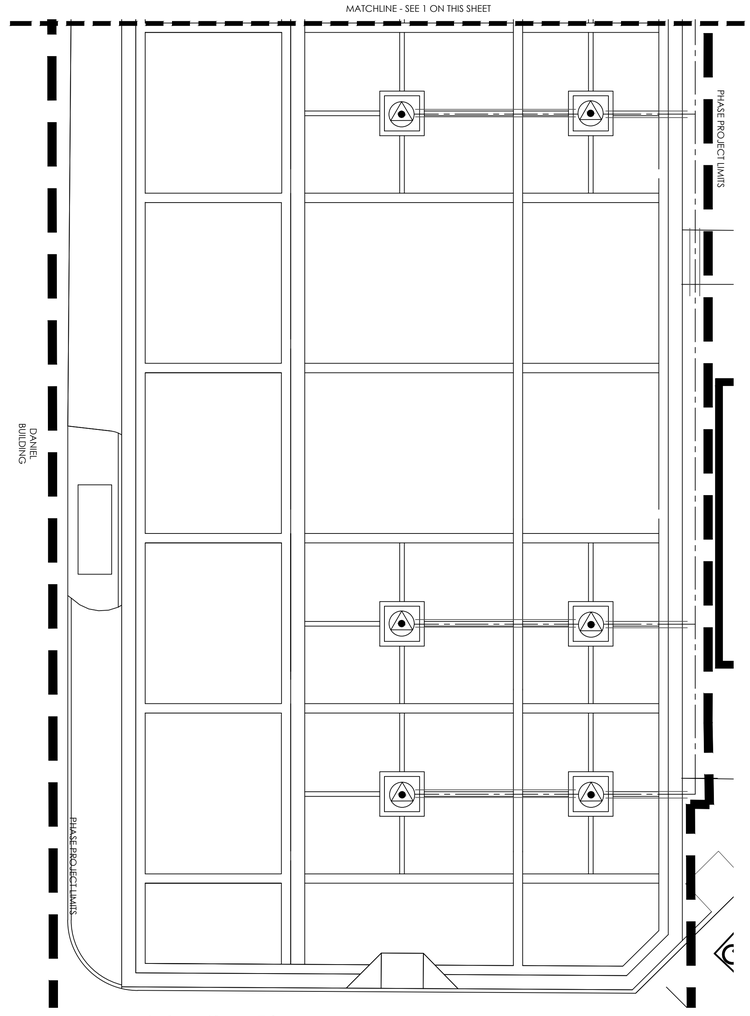


02 Irrigation Plan

SCALE: 1" = 10'-0"

0 5 10 20

02 Tree Protection Detail

SCALE: NTS

IRRIGATION NOTES:

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW PLANS, SPECIFICATIONS AND THE CONSTRUCTION SITE TO BECOME FAMILIAR WITH THE PROJECT. CONTRACTOR IS TO CONTACT APPROPRIATE AUTHORITIES FOR LOCATING ALL UTILITIES PRIOR TO CONSTRUCTION. NOTIFY ONE-CALL AT 811 OR AT THE WEB SITE WWW.DIGTESS.ORG. PLANS AND SPECIFICATION WILL BE STRICTLY ADHERED TO. DURING INSTALLATION ROUTINE INSPECTION FOR COMPLIANCE WILL TAKE PLACE. NONCONFORMING WORK WILL BE REMOVED AND CORRECTED TO THE OWNER'S SATISFACTION.

2. IT IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLY WITH CITY, STATE AND LOCAL ORDINANCES, RULES, CODES AND PERMITTING PERTAINING TO THIS WORK. AS PER TCEQ REQUIREMENTS, A LICENSED IRRIGATOR OR AN IRRIGATION TECHNICIAN MUST BE ON-SITE DURING THE INSTALLATION OF THE IRRIGATION SYSTEM. LICENSED IRRIGATOR(S) WILL SUPERVISE AN IRRIGATION TECHNICIAN WHEN CONNECTING AN IRRIGATION SYSTEM TO A WATER SUPPLY OR INSTALLING, MAINTAINING, ALTERING, REPAIRING, OR SERVICING AN IRRIGATION SYSTEM, AND/OR SUPERVISE AN INSTALLER CONNECTING AN IRRIGATION SYSTEM TO A WATER SUPPLY.

3. VERIFY STATIC PRESSURE TO BE SUFFICIENT FOR SYSTEM PERFORMANCE. NOTIFY IRRIGATION DESIGNER IF PRESSURE IS LESS THAN REQUIRED BY THE DESIGN.

4. POINT OF CONNECTION WILL BE EXISTING 2" WATER LINE AS SHOWN.

5. IRRIGATION DRAWING IS A SCHEMATIC REPRESENTATION. ALL MAINLINE TIE-IN LOCATIONS AND LATERAL PIPING TO BE LOCATED IN PLANTING AREAS. WHERE PIPE MUST PASS BENEATH FLATWORK AND ROADWAYS, SLEEVES ARE TO BE PROVIDED AND STUBBED-UP AS DETAILED. ANY PIPE, HEADS, COMPONENTS, ETC SHOWN IN ASPHALT OR CONCRETE ARE SHOWN FOR CLARITY ONLY.

6. ALL ZONE VALVES TO BE PRECEDED BY A LINE SIZED SPEARS SCHEDULE 80 ISOLATION VALVE. ALL ZONE VALVES TO BE INSTALLED IN RECTANGULAR VALVE BOXES AS NOTED. IT IS DESIRABLE TO INSTALL MULTIPLE VALVES IN A SINGLE VALVE BOX OF ADEQUATE SIZE ALLOWING FOR FUTURE ACCESS. A VALVE TAG WILL BE SECURED TO THE VALVE BOX LID, CHRISTY ID TAG OR EQUAL.

7. VERIFY CONTROLLER WITH OWNER. ALL LOW VOLTAGE WIRING TO BE SIZED AS NEEDED UF DIRECT BURY WIRE. WIRE CONNECTIONS TO BE MADE WITH DBYR 600V WATER PROOF CONNECTORS AT ALL SPLICES. PROVIDE A WIRE LOOP IN VALVE BOXES THAT WILL EXTEND A MINIMUM OF 36" ABOVE GRADE FOR ALL CONNECTIONS AND FUTURE CONNECTIONS. SEAL ALL LOOSE WIRE ENDS WITH SPECIFIED CONNECTORS. DBYR CONNECTORS ARE INTENDED FOR ONE TIME USE ONLY. SHOULD IT BE NECESSARY TO DISCONNECT A SPLICE, DISCARD CONNECTOR AND REPLACE WITH A NEW CONNECTOR. INSTALL WIRING BENEATH PIPE IN TRENCHES. TAPE WIRE TO THE UNDERSIDE OF THE MAINLINE ON 15' INTERVALS. WHERE WIRE MUST BE INSTALLED SEPARATE FROM THE MAINLINE INSTALL IN A 1" SCH 40 GRAY ELECTRICAL CONDUIT. FIELD SPLICES ARE DISCOURAGED OTHER THAN AT VALVES BUT WHERE THEY ARE UNAVOIDABLE AND PRE-APPROVED, INSTALL IN A 10" ROUND SPLICE BOX WITH A 36" ABOVE GRADE EXPANSION LOOP.

8. ALL MAINLINE PIPE DOWNSTREAM OF MAINLINE CONNECTIONS (EXCEPT WHERE NOTED ON THESE PLANS) AND LATERAL PIPE TO BE WHITE CLASS 200 PVC. ALL PIPE 3" AND SMALLER WILL BE SOLVENT WELD PIPE. SOLVENT WELD PVC PIPE AND FITTINGS PER MANUFACTURERS RECOMMENDATIONS. ALL PIPE AND FITTINGS TO BE PRIMED WITH PURPLE PRIMER WITHOUT EXCEPTION. FLOW VELOCITIES WILL GENERALLY DETERMINE PIPE SIZES. IN NO EVENT WILL THE FLOW VELOCITIES BE GREATER THAT 5 FPS. THE 5 FPS RULE IS SUPERSEDED BY ACTUAL PRESSURE LOSS CALCULATIONS. PRESSURE LOSS IN ANY ZONE WILL NOT BE GREATER THAN 10% OF THE RECOMMENDED OPERATING PRESSURE OF THE EMISSION DEVICE. PIPE SIZES WILL BE INCREASED TO COMPLY WITH THIS SPECIFICATION.

9. ALL SOLVENT WELD FITTINGS TO BE SCHEDULE 40, THREADED FITTINGS TO BE SCHEDULE 80. WHERE METAL FITTINGS OCCUR, ONLY SCHEDULE 80 MALE PVC THREADED INTO METAL FEMALE PIPE FITTINGS AND/OR GLASS-FILLED NYLON VALVES WILL BE ACCEPTED. CLOSE BY CLOSE SOLVENT WELDING OF FITTINGS WILL NOT BE ALLOWED. ALL FITTINGS WILL BE JOINED BY SUFFICIENT PIPE LENGTHS ALLOWING FUTURE REPAIRS AND/OR MODIFICATIONS.

10. SOLVENT WELD PIPE CONNECTION WILL BE MADE WITH APPROVED GLUE & PRIMER ONLY. PRIMER WITH PIGMENTATION WILL BE USED ON ALL SOLVENT WELD CONNECTIONS. WELD-ON P68 OR P70 PURPLE PRIMER. GLUE WILL BE WELD-ON 710 FOR PIPE UP TO 2", WELD-ON 705 OR 795 FOR PIPE UP TO 4". APPLY CEMENT TO PIPE SPIGOT FIRST, THEN TO FITTING TO AVOID EXCESS CEMENT BUILDUP INTERIOR TO FITTING AND PIPE. TWIST PIPE ¼ TURN, HOLD IN PLACE FOR 30 SECONDS AND WIPE EXCESS CEMENT FROM EXTERIOR SURFACES. GLUE AND CLEANER WILL BE SUBMITTAL ITEMS. SOLVENT WELDING OF PIPE IN WET CONDITIONS AND/OR IF THE OUTSIDE AMBIENT AIR TEMPERATURE FALLS BELOW THE MANUFACTURERS RECOMMENDED THRESHOLD, SHALL NOT OCCUR UNLESS DIRECTED BY THE IRRIGATION DESIGNER. FOR PROPER SOLVENT WELDING OF PIPE AND FITTINGS, CEMENT APPLICATOR MUST BE NO LESS THAN HALF THE SIZE OF THE PI

11. MAINLINE PIPING WILL BE FLUSHED PRIOR TO INSTALLING CONTROL VALVES. LATERAL PIPING WILL BE FLUSHED PRIOR TO INSTALLING NOZZLES. DRIP IRRIGATION WILL BE THOROUGHLY FLUSHED PRIOR TO INSTALLING FLUSH AND AIR RELIEF VALVES. WITH WATER RUNNING BEGIN CLOSEST TO THE ZONE VALVE INSTALLING NOZZLES OR DRIP FLUSH AND AIR VALVES. THE MOST DISTANT DEVICE ON THE ZONE WILL BE THE LAST DEVICE INSTALLED.

12. SEE DETAILS FOR REQUIRED PIPE AND VALVE DEPTHS. PIPE AND WIRING WILL BE INITIALLY COVERED WITH A 6" MINIMUM OF FINE MATERIAL FROM EXCAVATIONS. IMPORT FILL MATERIAL IF EXCAVATIONS ARE NOT SUITABLE FOR COVERING AND BACKFILLING OF ALL TRENCHES. ROCKS OR OTHER OBJECTS GREATER THAN 3/4" IN DIAMETER WILL NOT BE ALLOWED IN CONTACT WITH PIPE OR WIRING.

13. THE INTENT OF DRAWINGS IS TO PROVIDE 100% PLUS COVERAGE FOR ALL PLANT MATERIALS. SPRINKLER HEAD LOCATIONS MAY REQUIRE MODIFICATION DUE TO CHANGES IN THE SITE, DESIGN DEFICIENCIES, OR OTHER CHANGES UNFORESEEN AT THE TIME OF DESIGN. FINAL HEAD PLACEMENT AND COVERAGE WILL BE APPROVED BY THE IRRIGATION DESIGNER. CONTRACTOR IS RESPONSIBLE FOR ACHIEVING 100% COVERAGE OF THE IRRIGATION SYSTEM AS SHOWN ON THE FOLLOWING SHEETS. IF ALTERATIONS OR MODIFICATIONS ARE REQUIRED TO ACHIEVE 100% COVERAGE, IT SHALL BE BROUGHT TO THE ATTENTION OF, AND THE NEW LAYOUT STAKED, THE OWNER'S REPRESENTATIVE AND/OR THE IRRIGATION DESIGNER FOR APPROVAL.

14. A FINAL SCALED AS-BUILT DRAWING WILL BE FURNISHED UPON COMPLETION OF THE PROJECT AND PRIOR TO FINAL PAYMENT. ACCURATE RED LINE AS BUILDS WILL BE MAINTAINED IN THE CONSTRUCTION OFFICE UPDATED NO LESS THAN EVERY SEVEN DAYS. ITEMS TO DOCUMENT INCLUDE MAINLINE, TWO WIRE PATH DRAWN SCHEMATICALLY, VALVES, ISOLATION VALVES, FLOW SENSOR WIRE PATH, SPLICE BOXES AND ANY EQUIPMENT INCORPORATED INTO THE WORK THAT MAY NEED TO BE LOCATED AT A FUTURE TIME. EACH ITEM WILL HAVE TWO MEASUREMENTS FROM FIXED OBJECTS. OBJECTS WILL BE PERMANENT FEATURES AND WILL OCCUR AT DIFFERING ANGLES FROM THE DEVICE.

15. A COLORED ZONE MAP IDENTIFYING EACH ZONES WATERING EXTENTS, VALVE TYPE & STATION NUMBER (I.E. ZONE #1, ROTOR = R1, ETC.) TO BE COMPLETED ON A SHEET SEPARATE FROM THE IRRIGATION AS-BUILT. FURNISH A COMPLETE ZONE MAP UPON COMPLETION OF THE PROJECT AND PRIOR TO FINAL PAYMENT.

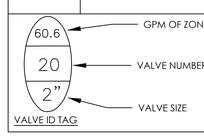
16. SUBMITTALS WILL BE REQUIRED FOR PRE-APPROVAL OF ALL MATERIALS TO BE INCORPORATED INTO THE IRRIGATION SYSTEM. IN THE EVENT THAT MORE THAN ONE PRODUCT MAY BE USED (I.E. PIPE AND FITTINGS), SUBMIT EACH FOR APPROVAL. MATERIALS NOT SUBMITTED AND APPROVED WILL BE REMOVED FROM THE SITE AT THE COST OF THE CONTRACTOR AND AT NO COST TO THE OWNER.

17. THE UNDERGROUND IRRIGATION SYSTEM SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP FOR ONE YEAR FOLLOWING FINAL ACCEPTANCE OF THE WORK.

18. CONTRACTOR TO STAKE HEAD LAYOUT AND GET APPROVAL FROM DESIGNER AND/OR OWNER'S REPRESENTATIVE PRIOR TO TRENCHING. IF NOT, CONTRACTOR IS RESPONSIBLE FOR ANY CORRECTIONS OR ALTERATIONS TO MATCH HEAD LAYOUT AND SPACING SHOWN ON PLANS AT CONTRACTOR'S EXPENSE.

IRRIGATION KEY

SYMBOL	DESCRIPTION	SPECIFIED TYPE	REMARKS
	DRIP RING	TREE DRIP RING	LARGE TREES: (52) .77GPH EMITTER
	DRIP VALVE	HUNTER ICZ DRIP VALVE	INSTALL W/ ISOLATION VALVE, FILTER AND PRESSURE REGULATOR
	1" BACKFLOW DEVICE	FEBCO 850 1"	INSTALL PER MANUFACTURER'S SPECIFICATIONS
	SLEEVES	PVC CL 200 SDR 21	TWICE SIZE OF THROUGH PIPE
	NEW 3" MAINLINE	PVC CL 200 SDR 21; GASKETED	CONNECT TO EX. 4" MAINLINE FROM HS+HS BUILDING
	TREE DRIP LINE	CLASS 200 PVC SIZED AS SHOWN	PRIME ALL JOINTS. JOINTS 2' AND OVER SHOULD BE SANDED.



VALVE ID TAG

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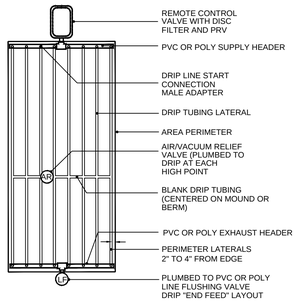
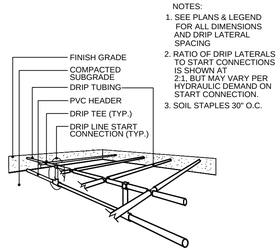
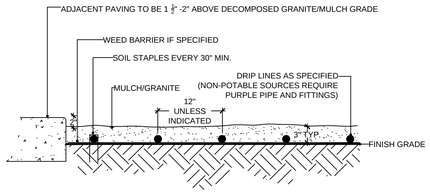


01 Drip Line Layout
SCALE: NTS



02 Drip Line Layout
SCALE: NTS



03 Drip Line Instal
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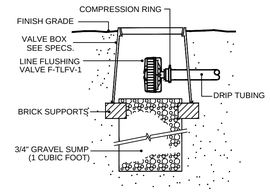

04 Air Relief Valve
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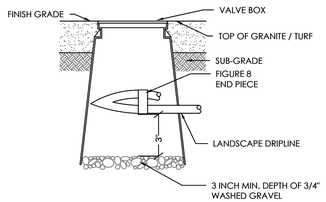

NOTE: INSTALL AT FARTHEST POINT OF DRIP ZONE, INSTALL AT EACH END POINT.

05 Drip Line Flushing End
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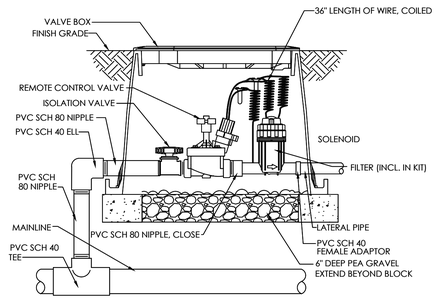
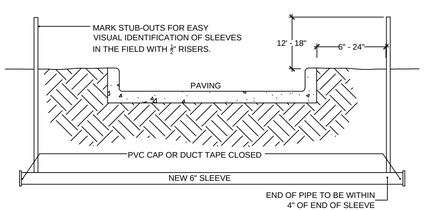
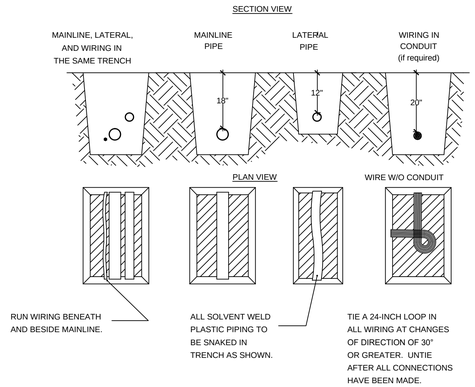


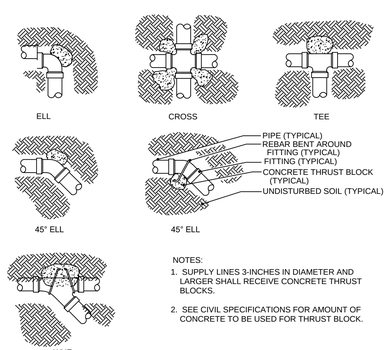
06 Drip Valve Assembly
SCALE: NTS



07 Sleeve Detail
SCALE: NTS

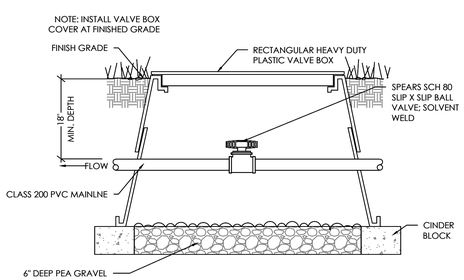


08 Trench Detail
SCALE: NTS



NOTES:
1. SUPPLY LINES 3-INCHES IN DIAMETER AND LARGER SHALL RECEIVE CONCRETE THRUST BLOCKS.
2. SEE CIVIL SPECIFICATIONS FOR AMOUNT OF CONCRETE TO BE USED FOR THRUST BLOCK.

09 Thrust Block Details
SCALE: NTS



10 Isolation Valve Detail
SCALE: NTS

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4400 N. Big Spring Avenue, Suite 203
Midland, Texas 79705
Phone: 432.684.8001
Facsimile: 432.683.3487
www.KDCassociates.com
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REGISTERED LANDSCAPE ARCHITECT
STATE OF TEXAS
JONATHAN L. H. PRUESSNER
3006
3.6.18

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MUSTANG PLAZA SOUTH EXTENSION DEVELOPMENT PLANS

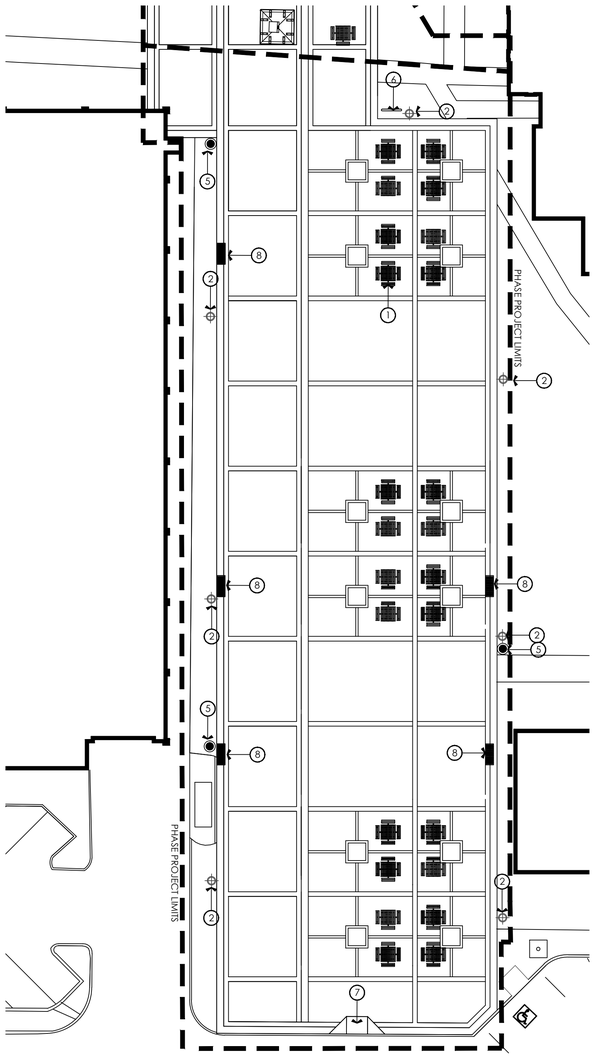
MIDWESTERN STATE UNIVERSITY
WICHITA FALLS, TX

Date: 12.21.17
Revisions: 1.16.18
3.6.18

Scale: As Shown

Irrigation Details

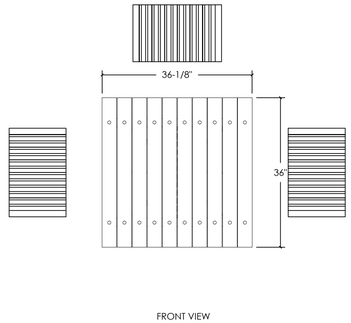
Sheet No.
L-4.2



01 Amenities Plan

SCALE: 1" = 20'-0"

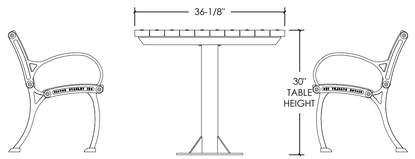
0 10 20 40



FRONT VIEW

HOMESTEAD COLLECTION ADA ACCESSIBLE TABLE SET IP-36 BY VICTOR STANLEY AND FB-324 BENCH. MOUNT PER MANUFACTURER'S SPECIFICATIONS. INSTALL BENCH QUANTITIES SHOWN ON PLANS. COLOR: TBD.

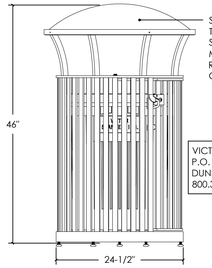
VICTOR STANLEY
P.O. DRAWER 330
DUNKIRK, MD 20754
800.368.2573



SIDE VIEW

01 Picnic Table Set

SCALE: NTS

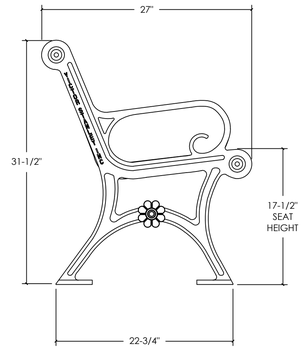


STEELSITES COLLECTION A-36 TRASH RECEPTICLE BY VICTOR STANLEY. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. COLOR: TBD.

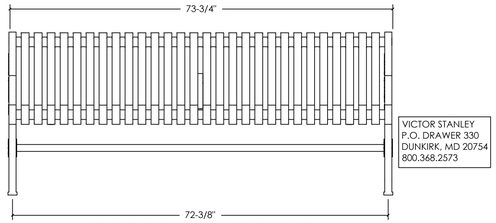
VICTOR STANLEY
P.O. DRAWER 330
DUNKIRK, MD 20754
800.368.2573

02 Trash Receptacle

SCALE: NTS



CLASSIC COLLECTION CR-196 6' BENCH BY VICTOR STANLEY. MOUNT PER MANUFACTURER'S SPECIFICATIONS. COLOR: TBD.

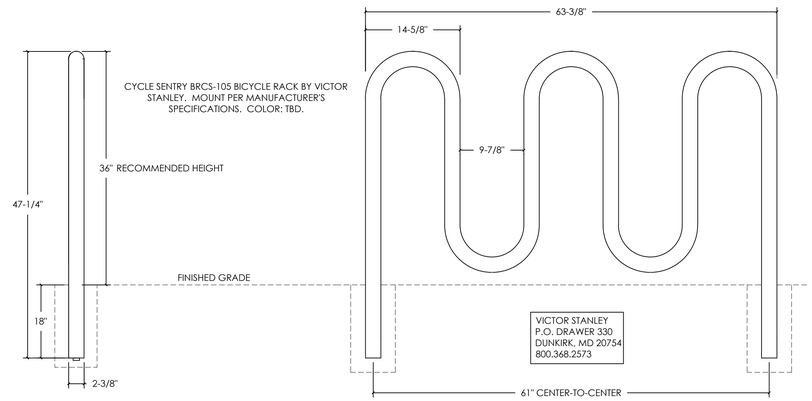


VICTOR STANLEY
P.O. DRAWER 330
DUNKIRK, MD 20754
800.368.2573

CENTER-TO-CENTER DISTANCES ARE APPROXIMATE
(VARIATIONS IN CASTINGS ARISE FROM DIFFERENT RATES OF COOLING)

03 Bench

SCALE: NTS

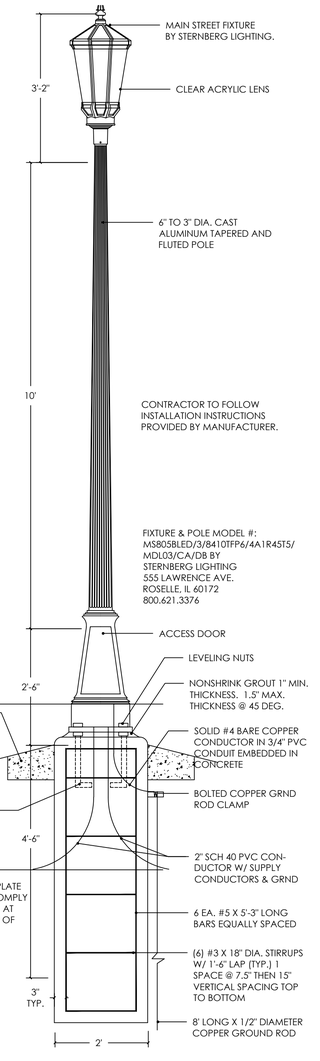


CYCLE SENTRY BRCS-105 BICYCLE RACK BY VICTOR STANLEY. MOUNT PER MANUFACTURER'S SPECIFICATIONS. COLOR: TBD.

VICTOR STANLEY
P.O. DRAWER 330
DUNKIRK, MD 20754
800.368.2573

04 Bicycle Rack

SCALE: NTS



05 Site Lighting

SCALE: NTS

KEY NOTES:

1. TYP. NEW PICNIC TABLE. SEE DETAILS AND SPECS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (1/L-5.0)
2. TYP. NEW AREA LIGHT. SEE DETAILS AND SPECS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (5/L-5.0)
3. EXISTING CONCRETE SIDEWALK.
4. NEW 3,000 PSI CONCRETE WITH MEDIUM BROOM FINISH. SEE DIMENSION PLAN AND DETAILS FOR WIDTH AND JOINT SPACING.
5. NEW TRASH RECEPTACLE. SEE DETAILS AND SPECIFICATIONS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (2/L-5.0)
6. NEW BICYCLE RACK. SEE DETAILS AND SPECIFICATIONS FOR INSTALLATION INSTRUCTIONS. (4/L-5.0)
7. NEW ADA ACCESSIBLE RAMP.
8. TYP. CR-196 CLASSIC COLLECTIONS BENCH BY VICTOR STANLEY. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (3/L-5.0)
9. PAVESTONE 80MM HOLLAND PAVER PLAZA

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STATE OF TEXAS
3.6.18

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MUSTANG WALK SOUTH EXTENSION DEVELOPMENT PLANS

MIDWESTERN STATE UNIVERSITY
WICHITA FALLS, TX

Date: 12.21.17
Revisions: 1.16.18
3.6.18

Scale: 1"=20'-0"

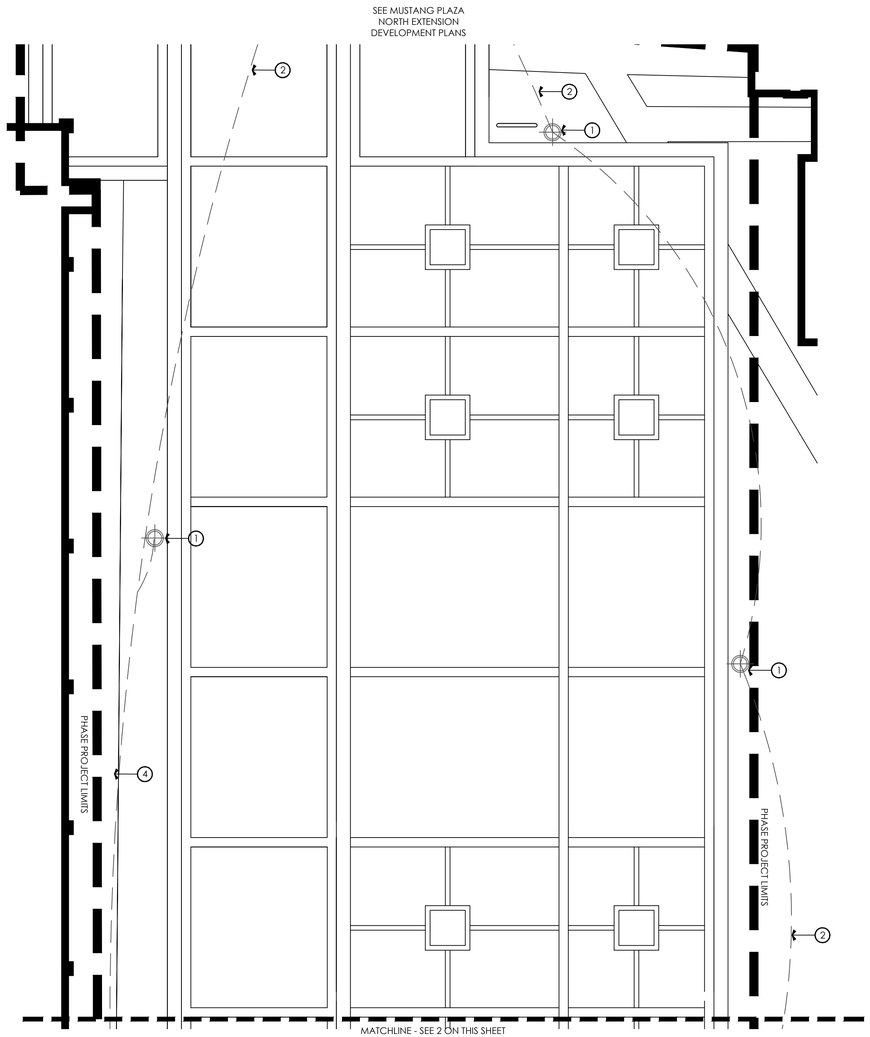
Amenities Plan

Sheet No.

L-5.0

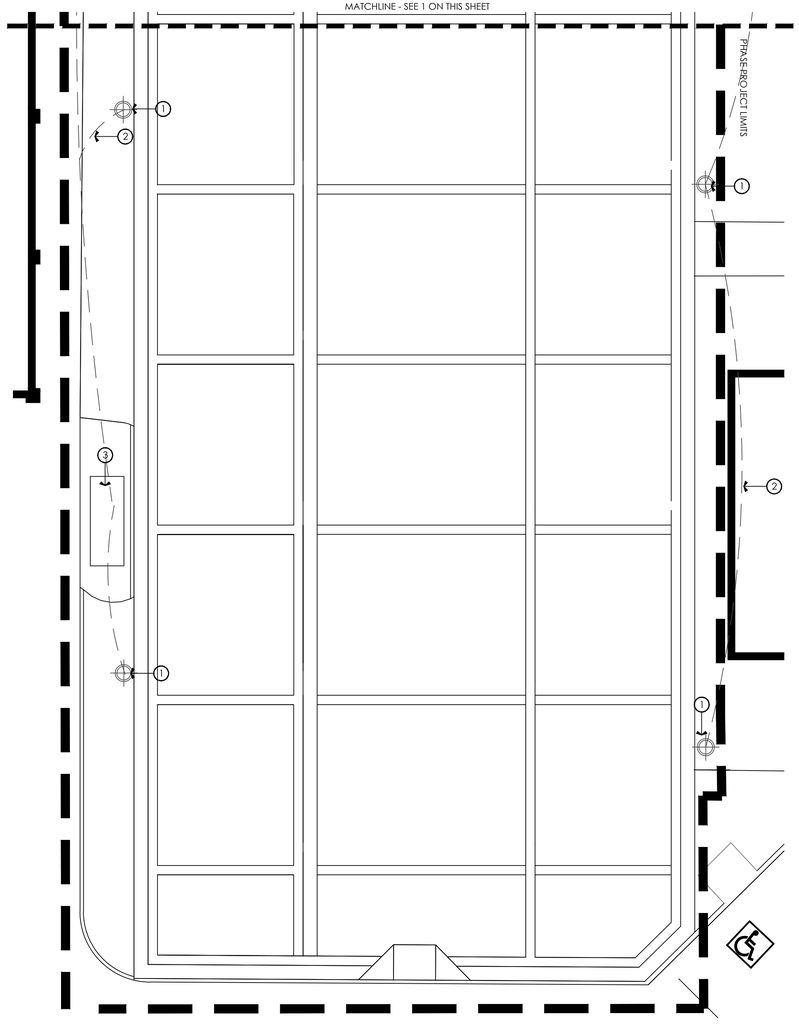
KEY NOTES:

1. NEW AREA LIGHT BY MS805BLED/3/8410TFP6/4A1R45T5/ MDL03/CA/DB BY STERNBERG LIGHTING. SEE DETAILS AND SPECIFICATIONS. INSTALL PER MANUFACTURER'S SPECIFICATIONS. (5 / L-5.0)
2. PROPOSED ELECTRICAL CONDUIT SUPPLY LINE FOR LIGHTING. CONTRACTOR TO SIZE APPROPRIATELY FOR REQUIRED VOLTAGE. CONFIRM SOURCE WITH OWNER. TIE INTO ELECTRICAL FOR MUSTANG PLAZA NORTH EXTENSION.
3. EXISTING ELECTRICAL TRANSFORMER. USE AS POWER SOURCE FOR LIGHTING. CONFIRM WITH MSU CONSTRUCTION MANAGER. CONTRACTOR TO TIE INTO EXISTING WIRE INSTALLED FOR NORTHERN SECTION OF PLAZA.
4. EXISTING LIGHTING WIRE FOR NORTH EXTENSION OF MUSTANG PLAZA.



01 Lighting Plan
SCALE: 1" = 10'-0"

0 5 10 20



02 Lighting Plan
SCALE: 1" = 10'-0"

0 5 10 20

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Midland, Texas 79705
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MIDWESTERN STATE UNIVERSITY
WICHITA FALLS, TX

Date: 12.21.17
Revisions: 1.16.18
3.6.18

Scale: 1"=10'-0"

Lighting Plan

Sheet No.

L-5.1

BID SHEET

RFP #735-18-8203

QUAD'S LANDSCAPING

Base Bid:_____

Alternate 1:_____

Alternate 2:_____

Total:_____

Company Name:_____

Address:_____

City:_____

Name:_____

Signature:_____

Email:_____

Telephone:_____

VENDOR REFERENCES

Please list three (3) references of current customers who can verify the quality of service your company provides. The University prefers customers of similar size and scope of work to this proposal. ***THIS FORM MUST BE RETURNED WITH YOUR PROPOSAL.***

REFERENCE ONE

Government/CompanyName:_____

Address:_____

ContactPersonandTitle:_____

Phone:_____ Fax:_____

Contract Period:_____ ScopeofWork:_____

REFERENCE TWO

Government/CompanyName:_____

Address:_____

ContactPersonandTitle:_____

Phone:_____ Fax:_____

Contract Period:_____ ScopeofWork:_____

REFERENCE THREE

Government/CompanyName:_____

Address:_____

ContactPersonandTitle:_____

Phone:_____ Fax:_____

Contract Period:_____ ScopeofWork:_____

AFFIDAVIT

The undersigned certifies that the bid prices contained in this proposal have been carefully checked and are submitted as correct and final and if bid is accepted (within 90 days unless otherwise noted by vendor), agrees to furnish any and/or all items upon which prices are offered, at the price(s) and upon the conditions contained in the Specifications.

STATE OF TEXAS
COUNTY OF WICHITA

BEFORE ME, the undersigned authority, a Notary Public in and for the State of Texas, on this day personally appeared

_____

_

who, after having first been duly sworn, upon oath did depose and say;

That the foregoing proposal submitted by _____

_____

_ hereinafter called "Bidder" is the duly authorized agent of said company and that the person signing said proposal has been duly authorized to execute the same. Bidder affirms that they are duly authorized to execute this contract, that this company, corporation, firm, partnership or individual has not prepared this bid in collusion with any other Bidder, and that the contents of this bid as to prices, terms or conditions of said bid have not been communicated by the undersigned nor by any employee or agent to any other person engaged in this type of business prior to the official opening of this bid.

Name and Address of Bidder:

_____

_____

_____

Telephone number_____

_____
Signature

Email_____

Name:_____

Title:_____

SWORN TO AND SUBSCRIBED BEFORE ME THIS _____day of _____,
20 _____.

_____
Notary Public in and for the
State of Texas.

AGREEMENT BETWEEN
MIDWESTERN STATE UNIVERSITY
AND

CONTRACT NO.

This Agreement made the day of in the year 20 , by and between , hereinafter called the Contractor, and the Board of Regents of Midwestern State University, hereinafter called the Owner,

WITNESSETH, that the Contractor and the Owner for the consideration hereinafter named agree as follows:

ARTICLE 1. SCOPE OF WORK: The Contractor shall furnish all of the materials and perform all of the work shown on the drawings and described in the specifications for the project entitled . These drawings and specifications prepared for Midwestern State University by , acting as and in these Contract Documents entitled the Project Architect. The Contractor shall do everything required by this Agreement, the General and Supplemental Conditions of the Contract, the Special Conditions, the Addenda, the Specifications, the Drawings, the Historically Underutilized Business (HUB) Subcontracting Plan, and the Proposal attached as **Exhibit 1** (including any unit prices stated therein).

The Specifications and Drawings are enumerated as follows:

SPECIFICATIONS: See attached as **Exhibit 2**.

DRAWINGS: See attached as **Exhibit 2**.

ADDENDA: See attached as **Exhibit 2**.

ALTERNATES: The following Alternate Proposals, fully described in the Specifications, are included as a part of this Contract: .

ARTICLE 2. TIME OF COMPLETION: The Owner shall provide a Notice to Proceed in which a date for commencement of the work shall be stated; such commencement date shall be 10 or more days after the date of the notice. The Contractor shall achieve substantial completion of the work within ( ) calendar days after such commencement date, as such completion date may be extended by approved Change Orders. The time set forth for completion of the work is an essential element of the Contract.

ARTICLE 3. THE CONTRACT SUM: The Owner shall pay the Contractor for performance of the Contract, subject to additions and deductions provided therein, the sum of ($), and make payment on account as hereinafter provided.

ARTICLE 4. HUB SUBCONTRACTING PLAN: The Owner has adopted Exhibit H, Policy on Utilization of Historically Underutilized Business ("Policy"), which is incorporated herein by reference. Contractor, as a provision of the Agreement must comply with the requirements of the Policy and adhere to the HUB Subcontracting Plan submitted with Contractor's Proposal and attached as **Exhibit 3**. No changes to the HUB Subcontracting Plan can be made by the Contractor without the prior written approval of the Owner in accordance with the Policy.

ARTICLE 5. LIQUIDATED DAMAGES: For each consecutive calendar day after the substantial completion period set forth in Article 2 above that any work, including the correction of deficiencies found during the final testing and inspection, is not completed, the amount of ($) will be deducted from the money due or becomes due the Contractor, not as a penalty but as liquidated damages representing the parties' estimate at the time of contract execution of the damages which the Owner will sustain for late completion.

ARTICLE 6. CERTIFICATION OF NO ASBESTOS CONTAINING MATERIALS OR WORK:

The Contractor shall provide a certification statement, included with each materials submittal, stating that no asbestos containing materials or work is included within the scope of the proposed submittal.

The Contractor shall insure that Texas Department of Health licensed individuals, consultants or companies are used for any required asbestos work including asbestos inspection, asbestos abatement plans/specifications, asbestos abatement, asbestos project management and third-party asbestos monitoring.

The Contractor shall provide at Substantial Completion, a notarized affidavit to the Owner and the Architect stating that no asbestos containing materials or work was provided, installed, furnished or added to the Project.

The Contractor shall take whatever measures he deems necessary to insure that all employees, suppliers, fabricators, materialmen, subcontractors, or their assigns, comply with this requirement.

All materials used on this Project shall be certified as non Asbestos Containing Building Materials (ACBM). The Contractor shall insure compliance with the following acts from all of his subcontractors and assigns:

Asbestos Hazard Emergency Response Act (AHERA—40 CFR 763-99 (7));

National Emission Standards for Hazardous Air Pollutants (NESHAP—EPA 40 CFR 61, National Emission Standard for Asbestos;

Texas Asbestos Health Protection Rules (TAHRP—Tex. Admin. Code Title 25, Part 1, Ch. 295C, Asbestos Health Protection

Every subcontractor shall provide a notarized statement that no ACBM has been used, provided, or left on this Project.

The Contractor shall provide, in hard copy and electronic form, all necessary material safety data sheets (MSDS) of all products used in the construction of the Project to the Texas Department of Health licensed inspector or Project Architect or Engineer who will compile the information from the MSDS and, finding no asbestos in any of the product, make a certification statement.

At Final Completion the Contractor shall provide a notarized certification statement per TAC Title 25 Part 1, Ch. 295.34, par. c.1 that no ACBM was used during construction of the Project.

ARTICLE 7. ACCEPTANCE OF BID OR AWARD OF CONTRACT: By signing this Agreement, the undersigned certifies as follows:

Assignment. This Agreement is a personal service contract for the services of Construction, and Contractor's interest in this Agreement, duties hereunder and/or fees due hereunder may not be assigned or delegated to a third party.

Records of expenses pertaining to Additional Services and services performed on the basis of a Worker Wage Rate or Monthly Salary Rate shall be kept on the basis of generally accepted accounting principles and in accordance with cost accounting standards promulgated by the Federal Office of Management and Budget Cost Accounting Standards Board and shall be available for audit by the Owner or the Owner's authorized representative on reasonable notice.

Family Code Child Support Certification. Pursuant to Section 231.006, Texas Family Code, Service Provider certifies that it is not ineligible to receive the award of or payments under this Agreement and acknowledges that this Agreement may be terminated and payment may be withheld if this certification is inaccurate.

Eligibility Certification. Pursuant to Section 2155.004, Texas Government Code, Service Provider certifies that the individual or business entity named in this Agreement is not ineligible to receive the award of or payments under this Agreement and acknowledges that this Agreement may be terminated and payment withheld if this certification is inaccurate.

Franchise Tax Certification. A corporate or limited liability company Contractor certifies that it is not currently delinquent in the payment of any Franchise Taxes due under Chapter 171 of the Texas Tax Code, or that the corporation or limited liability company is exempt from the payment of such taxes, or that the corporation or limited liability company is an out-of-state corporation or limited liability company that is not subject to the Texas Franchise Tax, whichever is applicable.

Payment of Debt or Delinquency to the State. Pursuant to Sections 2107.008 and 2252.903, Texas Government Code, Contractor agrees that any payments owing to Contractor under this Agreement may be applied directly toward any debt or delinquency that Contractor owes the State of Texas or any agency of the State of Texas regardless of when it arises, until such debt or delinquency is paid in full.

Entire Agreement; Modifications. This Agreement supersedes all prior agreements, written or oral, between Contractor and Owner and shall constitute the entire Agreement and understanding between the parties with respect to the Project. This Agreement and each of its provisions shall be binding upon the parties and may not be waived, modified, amended or altered except by a writing signed by Contractor and Owner.

Captions. The captions of paragraphs in this Agreement are for convenience only and shall not be considered or referred to in resolving questions of interpretation or construction.

Governing Law and Venue. This Agreement and all of the rights and obligations of the parties and all of the terms and conditions shall be construed, interpreted and applied in accordance with and governed by and enforced under the laws of the State of Texas without reference to its conflicts of law provisions. The county where the Project is located shall be the sole place of venue for any legal action arising from or related to this Agreement or the Project in which the Owner is a party.

Waivers. No delay or omission by either party in exercising any right or power arising from non compliance or failure of performance by the other party with any of the provisions of this Agreement shall impair or constitute a waiver of any such right or power. A waiver by either party of any covenant or condition of this Agreement shall not be construed as a waiver of any subsequent breach of that or of any other covenant or condition of the Agreement.

Binding Effect. This Agreement shall be binding upon and inure to the benefit of the parties and their respective permitted assigns and successors.

Appointment. Owner hereby expressly reserves the right from time to time to designate by notice to Contractor a representative(s) to act partially or wholly for Owner in connection with the performance of Owner's obligations. Contractor shall act only upon instructions from the designated representative(s) unless otherwise specifically notified to the contrary.

Records. Records of Contractor’s costs, reimbursable expenses pertaining to the Project and payments shall be available to Owner or its authorized representative during business hours and shall be retained for four (4) years after final Payment or abandonment of the Project, unless Owner otherwise instructs Contractor in writing.

Notices. All notices, consents, approvals, demands, requests or other communications relied on by the parties shall be in writing. Written notice shall be deemed to have been given when delivered in person to the designated representative of the Contractor or Owner for whom it is intended; or sent by U. S. Mail to the last known business address of the designated representative; or transmitted by fax machine to the last know business fax number of the designated representative.

Mail notices are deemed effective upon receipt or on the third business day after the date of mailing, whichever is sooner. Fax notices are deemed effective the next business day after faxing.

Severability. Should any term or provision of this Agreement be held invalid or unenforceable in any respect, the remaining terms and provisions shall not be affected and this Agreement shall be construed as if the invalid or unenforceable term or provision had never been included.

Illegal Dumping. The Contractor shall ensure that it and all of its Subcontractors and assigns prevent illegal dumping of litter in accordance with Title 5, Texas Health and Safety Code, Chapter 365.

Ethics Matters/No Financial Interest**.** Contractor and its employees, agents, representatives and subcontractors have read and understand University's Conflicts of Interest Policy, University's Standards of Conduct Guide and applicable state ethics laws and rules. Neither Contractor nor its employees, agents, representatives or subcontractors will assist or cause University employees to violate University's Conflicts of Interest Policy, provisions described by University's Standards of Conduct Guide, or applicable state ethics laws or rules. Contractor represents and warrants that no member of the Board has a direct or indirect financial interest in the transaction that is the subject of this Agreement.

By signature hereon, Contractor certifies that no member of the Board of Regents of Midwestern State University, or Executive Officers, including component institutions, has a financial interest, directly or indirectly, in the transaction that is the subject of this contract.

BY SIGNING BELOW, the Parties have executed and bound themselves to this Agreement as of the day and year first above written.

MIDWESTERN STATE UNIVERSITY

By: _____ By: _____
Signature Signature

_____ _____
Print name Print name

Date: _____ Date: _____